Indoor Air Sampling Analysis and Risk Characterization Report

Site:

Former United Shoe Machinery Division North Parcel
181 Elliot Street, Beverly, MA

Prepared For:

Cummings Properties, LLC
200 West Cummings Park
Woburn, MA 01801

Prepared by:

GEOSPHERE
ENVIRONMENTAL MANAGEMENT INC.

51 Portsmouth Avenue, Exeter, NH 03833
Phone: 603-773-0075 Fax: 603-773-0077
Web: www.geospherenh.com

Project No. 12201

May 24, 2013

Indoor Air Sampling Analysis and Risk Characterization Report for United Shoe Machinery Division North Parcel, Beverly, Massachusetts
Document Title

Bruce A. Hoskins, P.E., LSP,
Geosphere Environmental Management, Inc.
Prepared By

51 Portsmouth Avenue, Exeter, NH 03833, (603) 773-0075
Address and Telephone Number

May 24, 2013
Date

Project Manager: _____
Signature

Bruce A. Hoskins_____
Printed Name/Date

Project QA Officer: _____
Signature

David Niemeyer_____
Printed Name/Date

U.S. EPA Project Manager Approval: _____
Signature

Marilyn St. Fleur_____
Printed Name/Date

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1.0 SITE BACKGROUND AND HISTORY

1.1 Site Background

The former United Shoe Machinery (USM) Division North Parcel consists of approximately 80 acres in the vicinity of 181 Elliott Street in Beverly, Massachusetts. Approximately 70 acres of the North Parcel are owned by Beverly Commerce Park, LLP; the remaining approximate 10 acres were donated to the City of Beverly for a school and public safety building. A Locus Plan is shown as **Figure 1** and a Site Plan as **Figure 2**. Cummings Center (located on the USM Division North Parcel) constitutes only a portion of the entire property that was the former USM Machinery Division. The "South Parcel" of the former USM Machinery Division is located on the south side of Elliot Street (Route 62).

This site has been included in the U.S. EPA's RCRA 2020 Corrective Action Universe list. By the year 2020, EPA and the authorized states plan to have largely completed the work of implementing final remedies at all facilities requiring Corrective Action. This site is listed under the site number MAD 043415991 as USM Machinery Division. Massachusetts Department of Environmental Protection (MassDEP) has not been given RCRA authorization for this site therefore EPA is acting as the agency in charge for the RCRA program. As part of the RCRA 2020 program, EPA is overseeing an audit of prior remedial actions. Despite that the site has undergone significant site assessment and remediation, the site is not listed as Remedy Construction in the RCRA 2020 database.

A Quality Assurance Project Plan (QAPP) and Sampling and Analysis Plan (SAP) dated July 30, 2012 was executed on September 9, 2012. This document included information on the proposed additional indoor air sampling activities to be implemented. Based upon review of the site history and consideration of the current use of the site, the primary question to be addressed by this investigation is whether potential volatile contaminant concentrations present a significant risk to the indoor air of the occupied buildings.

The Data Quality Objectives (DQO) for this investigation are designed to characterize the presence of volatile organic compounds in the indoor air of the occupied buildings and to determine if the presence of such compounds represents a significant risk to human health. Specific attention shall be given to the child, which represents the most sensitive receptor. Child day care and/or school uses currently occur in portions of Buildings 100, 500, and 600.

1.2 Site Indoor Air Sampling History

Previous investigations were conducted to assess indoor air quality in the buildings at the site. Such investigations involved the collection of soil gas data collected from soil borings installed underneath or adjacent to building footprints. In December 2004, soil gas probes were installed and soil gas samples were collected from around the exterior walls of Building 600 (see **Figure 2**). In February 2006, additional soil gas probes were installed and soil gas samples were

collected from around the exterior walls of Building 600 and underneath the floor slab of Building 500 (see **Figure 2**). Soil gas samples were analyzed using the TO-15 method for volatile compounds and the Massachusetts Air-Phase Petroleum Hydrocarbon (APH) method. The following compounds were detected at least once during the 2004 and 2006 sampling events:

Acetone	Chloromethane	n-Hexane	Tetrachloroethylene
Benzene	Cyclohexane	2-Hexanone	Tetrahydrofuran
Bromodichloromethane	Dibromochloromethane	Isopropyl Alcohol	Toluene
1,3-Butadiene	1,1-Dichloroethane	Methylene Chloride	1,1,1-Trichloroethane
C_5-C_8 Aliphatics	Ethanol	Methyl Ethyl Ketone	Trichlorofluoromethane
C_9-C_{12} Aliphatics	Ethyl Acetate	Methyl t-Butyl Ether	1,2,4-Trimethylbenzene
C_9-C_{10} Aromatics	Ethylbenzene	4-Methyl-2-Pentanone	1,3,5-Trimethylbenzene
Carbon Disulfide	4-Ethyl Toluene	Naphthalene	2,2,4-Trimethylpentane
Chloroform	Heptane	Propylene	Xylenes (all isomers)

Another investigation to address indoor air quality was performed in February 2008, when soil gas probes were installed around the exterior perimeter of Building 100. Soil gas samples were collected and analyzed using the TO-15 method for volatile compounds and the Massachusetts APH method. The following compounds were detected at least once during the 2008 sampling event:

Acetone	1,1-Dichloroethane	n-Hexane	Tetrahydrofuran
C_5-C_8 Aliphatics	1,1-Dichloroethene	Isopropyl Alcohol	Toluene
C_9-C_{12} Aliphatics	Dichlorodifluoromethane	Methylene Chloride	1,1,1-Trichloroethane
Carbon Disulfide	Ethanol	Methyl Ethyl Ketone	Trichloroethylene
Chloroethane	Heptane	Tetrachloroethylene	Trichlorofluoromethane
Chloroform			

Separate site-specific risk characterizations were performed using the 2004 and 2006 data for Buildings 500 and 600 and the 2008 data for Building 100. Risk characterizations were performed using the Method 3 protocols under the Massachusetts Contingency Plan (310 CMR 40.0000). As actual indoor air data had not been collected, applicable risk models were used to predict indoor air concentrations. These risk characterizations all concluded that there was no significant risk to human health (either to the child or adult) as a result of potential indoor air concentrations of volatile compounds based on the results of the soil gas data.

The use of historical data as a baseline is considered appropriate as the purpose of this additional investigation is to determine if significant risk exists from compounds that may have been present during previous USM facility operations. The use of historic data allows for the inclusion of degradation compounds of those volatile compounds that have been previously detected as compounds of concern.

2.0 SUMMARY OF SAMPLING AND ANALYSIS PLAN

This Sampling and Analysis Plan is limited to the collection of air samples to establish conditions related to indoor air quality where children are present on the property for school or day care purposes. There are four locations on the property where such use is ongoing, each located on the ground level of the buildings, which are slab on grade:

- Bright Horizons Children's Center
  100 Cummings Center, S-149-J

- Futures Behavior Therapy Center
  100 Cummings Center, S-157-J

- New England Academy
  500 Cummings Center, S-1100

- Beverly Children's Learning Center
  600 Cummings Center, S-171-X

Samples were collected during both summer and winter seasons to allow for seasonal variation. In addition, during each sampling event, one sample was collected from an exterior location to establish local ambient background conditions (the roof of the Northeast Parking Deck). The locations of the above-described uses are shown in **Figure 3**.

During each sampling event, a Summa canister was placed at each of the five previously designated sampling locations. At one of the indoor sampling locations, a second canister was also placed in order to collect a duplicate sample. The sample collection duration was approximately twenty-four hours.

Samples were analyzed for the following parameters:

- Air-Phase Petroleum Hydrocarbons (APH)
- Volatile Organic Compounds (VOCs) using EPA Method TO-15

Where feasible, sample analysis was performed in the SIM mode to obtain the lowest achievable (i.e., most conservative) detection limits.

3.0 SEPTEMBER 2012 INDOOR AIR SAMPLE COLLECTION

3.1 Initial Pre-Sampling Screening and Sample Location Selection

On September 13, 2012, the identified building spaces were inspected for the presence of potential volatile substances that could represent indoor sources of volatile compounds. Interviews were conducted with the staff occupying the spaces to discuss the types of substances used in the space that may contain volatile substances and to identify locations within the spaces to place the air sampling devices that would not be disturbed during the sample collection period. In addition, the ambient air in each of the building spaces to be sampled was screened using a photoionization detector (PID) with an 11.8 eV lamp in accordance with the attached standard operating procedure. The PID was calibrated to measure total volatile organic compounds (VOCs) in ambient air, as benzene, in parts per million by volume (ppmv).

Five sample locations were selected at the initial pre-sampling site meeting. One sample location was within the interior space of each of the four tenant spaces where child care, day care and/or school operations are ongoing. A fifth sample location was identified at the site exterior and served as an outdoor background location. The selected outdoor location was the roof level (third floor) of the southeast corner of the Northeast Parking Deck (250 Cummings Center – see **Figure 3**). Indoor sampling locations were selected such that sampling devices would not be located next to exterior windows or doors. Locations were also selected such that the sampling devices would not be disturbed during the sample collection time.

Specific notes regarding each space are listed below:

Bright Horizons Children's Center, 100 Cummings Center, S-149-J

- PID reading of ambient air located in general corridor outside Bright Horizons space was 0.5-1.5 ppmv.
- According to interviewed personnel, HVAC system within Bright Horizons space is always on.
- Cleaning chemicals are stored in the tenant's laundry room and kitchen areas.
- PID reading of ambient air located in tenant's laundry room was <0.1-0.5 ppmv.
- Sample location selected in tenant Director's Office (see **Figure 4**). PID reading of ambient air located in Director's Office was <0.1-0.5 ppmv.

Futures Behavior Therapy Center, 100 Cummings Center, S-157-J

- PID reading of ambient air located in general corridor outside tenant space was <0.1-0.5 ppmv.
- No chemicals were observed within tenant space.
- PID reading of ambient air located in tenant's laundry room was 1.0-1.5 ppmv.

- Sample location selected in tenant Administrative Office (see **Figure 5**). PID reading of ambient air located in Office was <0.1-0.5 ppmv.

New England Academy, 500 Cummings Center, S-1100

- According to interviewed personnel, HVAC system is manually turned on and off with no regular schedule. There are multiple HVAC zones within the space.
- Cleaning chemicals are stored in the tenant's storage room and kitchen areas. Cleaning contractors are present after each business day and use Pine Sol as the primary cleaner.
- The space is painted twice per year and carpets are cleaned twice per year; neither activity was ongoing during sampling.
- PID reading of ambient air located in tenant's storage room was <0.1-0.5 ppmv.
- Sample location selected in office of Brian Jukins (see **Figure 6**). PID reading of ambient air located in office was <0.1-0.5 ppmv.

Beverly Children's Learning Center, 600 Cummings Center, S-171-X

- According to interviewed personnel, HVAC system is operated manually. It is left on during the day and turned off after business hours.
- Cleaning chemicals are stored in the tenant's laundry room. Cleaning contractors are present after each business day and use cleaning chemicals stored in laundry room. Automotive chemicals (motor oil, antifreeze, etc.) are also stored in the laundry room; such chemicals are used for the tenant vehicles stored outside the building.
- PID reading of ambient air located in tenant's laundry room was 0.5-1.5 ppmv.
- Sample location selected in classroom known as Yellow 3 (see **Figure 7**). PID reading of ambient air located in the classroom was <0.1-0.5 ppmv.

Northeast Parking Deck, 250 Cummings Center

- Sampling location selected on the roof (third story). Location is directly above Room 268H at the building southeast corner.
- PID reading of ambient air located on deck roof was 0.5-1.5 ppmv.

3.2 Air Sample Collection

Samples were collected using a six-liter canister for the purposes of collecting a 24-hour composite. Canisters and regulators were provided by Alpha Analytical of Mansfield, MA. One canister was placed in each of the sampling locations as described in Section 3.1. In addition, a second canister was placed in the sampling location at S-149-J; this second canister represented a field duplicate. Sampling was initiated on September 20, 2012 and concluded on September 21, 2012. Details on the sampling canisters are provided in the table below:

Sample Location	Sampling Start Time and Date	Sampling Stop Time and Date	Canister ID	Regulator ID	Regulator Start Pressure (inches Hg)	Regulator Stop Pressure (inches Hg)
S-149-J	4:25 PM 9/20/12	4:25 PM 9/21/12	1531	0264	-30.25	-7.96
S-149-J Duplicate	4:30 PM 9/20/12	4:30 PM 9/21/12	934	0131	-30.50	-7.88
S-157-J	4:44 PM 9/20/12	4:44 PM 9/21/12	1640	0330	-30.67	-9.95
S-1100	5:00 PM 9/20/12	5:00 PM 9/21/12	943	0194	-30.32	-10.72
S-171-X	5:07 PM 9/20/12	5:07 PM 9/21/12	1632	0500	-30.04	-7.66
Northeast Parking Deck	5:18 PM 9/20/12	5:18 PM 9/21/12	1629	0145	-29.16	-4.73

The canisters were received by Alpha Analytical on September 24, 2012 under a chain of custody. Samples were requested for analysis for the following parameters:

- Air-Phase Petroleum Hydrocarbons (APH)
- Volatile Organic Compounds (VOCs) using EPA Method TO-15

Sample analysis was requested to be performed in the SIM mode to obtain the lowest achievable detection limits. In accordance with the APH analytical method, the potential identification of non-APH compounds (such as chlorinated solvents, ketones, and ethers) may represent an interference with the quantitative response within the aliphatic or aromatic hydrocarbon range. A specific request was made by GEOSPHERE for non-APH compounds to be identified in the laboratory report form or narrative, such that the data may be evaluated for such potential interferences. In response to the request, all significant concentrations of non-petroleum VOCs detected in the TO-15 analysis were subtracted from the corresponding hydrocarbon ranges in the APH analysis by Alpha Analytical.

3.3 Meteorological Data During Sample Collection

The following weather conditions were observed from the weather station at the Beverly Municipal Airport during the days of sample collection:

Date	Mean Temperature (°F)	Mean Sea Level Pressure (Inches)	Mean Wind Speed (Miles Per Hour)	Precipitation (Inches)
9/20/2012	58.9	30.20	14.38	0.00
9/21/2012	57.6	30.14	7.60	0.00

4.0 FEBRUARY 2013 INDOOR AIR SAMPLE COLLECTION

4.1 Air Sample Collection

Samples were collected using a six-liter canister for the purposes of collecting a 24-hour composite. Canisters and regulators were provided by Alpha Analytical of Mansfield, MA. One canister was placed in each of the sampling locations as described in Section 3.1. In addition, a second canister was placed in the sampling location at S-149-J; this second canister represented a field duplicate. Care was taken to place the canisters as close to the exact locations as previous canister placement during the September 2012 sampling event. Sampling was initiated on February 4, 2013 and concluded on February 5, 2013. Details on the sampling canisters are provided in the table below:

Sample Location	Sampling Start Time and Date	Sampling Stop Time and Date	Canister ID	Regulator ID	Regulator Start Pressure (inches Hg)	Regulator Stop Pressure (inches Hg)
S-149-J	3:05 PM 2/4/13	3:05 PM 2/5/13	1000	0241	-29.36	-7.35
S-149-J Duplicate	3:07 PM 2/4/13	3:07 PM 2/5/13	1608	0354	-29.55	-8.63
S-157-J	3:14 PM 2/4/13	3:14 PM 2/5/13	1583	0223	-29.67	-7.80
S-1100	3:40 PM 2/4/13	3:40 PM 2/5/13	967	0373	-29.53	-9.93
S-171-X	3:30 PM 2/4/13	3:30 PM 2/5/13	608	0427	-29.81	-9.30
Northeast Parking Deck	3:20 PM 2/4/13	3:20 PM 2/5/13	985	0286	-28.92	-6.04

The canisters were received by Alpha Analytical on February 6, 2013 under a chain of custody. Samples were requested for analysis for the following parameters:

- Air-Phase Petroleum Hydrocarbons (APH)
- Volatile Organic Compounds (VOCs) using EPA Method TO-15

Sample analysis was requested to be performed in the SIM mode to obtain the lowest achievable detection limits. In accordance with the APH analytical method, the potential identification of non-APH compounds (such as chlorinated solvents, ketones, and ethers) may represent an interference with the quantitative response within the aliphatic or aromatic hydrocarbon range. A specific request was made by GEOSPHERE for non-APH compounds to be identified in the

laboratory report form or narrative, such that the data may be evaluated for such potential interferences. In response to the request, all significant concentrations of non-petroleum VOCs detected in the TO-15 analysis were subtracted from the corresponding hydrocarbon ranges in the APH analysis by Alpha Analytical.

4.2 Meteorological Data During Sample Collection

The following weather conditions were observed from the weather station at the Beverly Municipal Airport during the days of sample collection:

Date	Mean Temperature (ºF)	Mean Sea Level Pressure (Inches)	Mean Wind Speed (Miles Per Hour)	Precipitation (Inches)
2/4/2013	30.2	29.73	18.4	0.00
2/5/2013	27.6	29.96	5.8	0.00

5.0 SUMMARY OF AIR SAMPLING RESULTS

A summary of the air sampling results for samples collected in September 2012 and February 2013 is provided in **Table 1**. The full analytical reports are presented in **Appendix A**.

For the purposes of initial data risk evaluation, analysis results were compared to the EPA Target Risk values (carcinogenic = 1E-06 or Hazard Index = 1.0) and the MassDEP Residential Threshold Values as presented in the July 30, 2012 QAPP. These values are also included in **Table 1**. Exceedance of these values does not mean a significant risk to human health is present; a detailed site-specific risk evaluation was completed and is summarized in Section 6.0.

A total of 69 compounds (or groups of compounds) were included on the sample analysis list. 66 compounds were related to the VOC analysis using the EPA TO-15 method and 11 compounds were included for APH analysis. A total of eight compounds (1,3-butadiene, benzene, ethylbenzene, methyl-tert-butyl ether, naphthalene, toluene, m- & p-xylenes, and o-xylenes) were included in the analysis list for both methods.

A limited data validation was performed on the sample analysis in conformance with the QAPP. In summary, the data validation concluded that in general, the data appear to be valid as reported and may be used for decision-making purposes. The Data Validation Memos for each sampling event are included as **Appendix B**.

Of specific note, a total of nine compounds (1,2,4-trimethylbenzene, 1,3,5-trimethylbenzene, 1,2-dichloroethane, benzene, bromodichloromethane, carbon tetrachloride, chloroform, naphthalene, and tetrachloroethylene) were detected in one or more samples at levels that exceeded the EPA target risk values. Two of these compounds (1,2,4-trimethylbenzene, and tetrachloroethylene) were detected at levels above the EPA target risk value in only a single location. Five of these compounds (1,2,4-trimethylbenzene, benzene, carbon tetrachloride, chloroform, and tetrachloroethylene) were also detected in the outdoor background air sample location. Three compounds (benzene, carbon tetrachloride, and chloroform) were detected in the outdoor background sample location at levels that exceeded the EPA target risk value. The three petroleum hydrocarbon fractions analyzed in the APH method were also detected in one or more samples above the MassDEP target risk values; these fractions were not detected in the outdoor background samples.

In addition, there were eleven compounds from the VOC analyte list (1,1,2,2-tetrachloroethane, 1,2-dibromoethane, 1,4-dioxane, 3-chloropropene, benzene, benzyl chloride, bromodichloromethane, dibromochloromethane, hexachlorobutadiene, naphthalene, and vinyl bromide) where the method detection limit exceeded the EPA target risk value. Of these compounds, only benzene and naphthalene were detected in any sample.

A qualitative comparison of these results was made with the historic data collected in soil gas between 2004 and 2008 (as previously discussed in Section 1.2). Specifically, a comparison was made to identify which compounds detected in the indoor air analysis had been previously detected in soil gas samples. When performing this analysis, the following compounds were

detected both in indoor air samples and in historic soil gas samples:

Acetone	Chloromethane	Isopropyl Alcohol	Tetrachloroethylene
Benzene	Cyclohexane	Methylene Chloride	Tetrahydrofuran
Bromodichloromethane	Dichlorodifluoromethane	Methyl Ethyl Ketone	Toluene
1,3-Butadiene	Ethanol	4-Methyl-2-Pentanone	1,1,1-Trichloroethane
C_5-C_8 Aliphatics	Ethylbenzene	M+P Xyenes	Trichlorofluoromethane
C_9-C_{12} Aliphatics	4-Ethyl Toluene	Naphthalene	1,2,4-Trimethylbenzene
C_9-C_{10} Aromatics	Heptane	O-Xylene	1,3,5-Trimethylbenzene
Chloroform	n-Hexane		

The following compounds were detected in indoor air samples but not in historic soil gas samples:

1,2-Dichloroethane	Carbon tetrachloride	Freon-113	Styrene

The following compounds were detected in historic soil gas samples but not in indoor air samples:

Carbon Disulfide	1,1-Dichloroethane	2-Hexanone	Trichloroethylene
Chloroethane	1,1-Dichloroethene	Methyl t-Butyl Ether	2,2,4-Trimethylpentane
Dibromochloromethane	Ethyl Acetate	Propylene	

The primary site contaminants during site assessment and remediation conducted in the 1980s and 1990s consisted of chlorinated solvents and petroleum hydrocarbons. 11 compounds that had been detected in historic soil gas samples were not detected in the indoor air. Several of these 11 compounds are related to chlorinated solvents and/or their degradation products, most notably trichloroethylene, 1,1-dichloroethane, and 1,1-dichloroethene which were detected during the 1980s site assessment. As these compounds were not detected in indoor air in any of the sampling locations, this is an indication that vapor intrusion is not occurring within the buildings at the site.

Although a total of 34 compounds were detected in indoor air and 30 of these compounds were also detected in historic soil gas samples, the majority of these compounds are not related to the petroleum and solvent compounds identified during the 1980s site assessment and appear to be unrelated to former USM operations.

6.0 RISK CHARACTERIZATION

6.1 Selection of Constituents of Concern (COC)

COCs are those chemicals that are both identified in samples collected at the site and are associated with a release of oil and/or hazardous material (OHM). Unless specific justification can be provided for eliminating a COC from the risk characterization, all constituents detected at a disposal site are considered to be COCs and are carried through the risk characterization process. Constituents are eliminated from the list of COCs if they are present at a low frequency of detection and in low concentrations; if they are present at levels which are consistent with "background" concentrations for the area and there is no evidence that these chemicals are related to activities at the site; or if the chemicals are field or laboratory contaminants. Constituents may also be eliminated if they are considered essential nutrients and are therefore not toxic at the concentrations detected in site media.

Laboratory analytical data from indoor air samples collected during site assessment were analyzed for a total of 66 VOCs and the three hydrocarbon fractions that constitute the APH analysis. Of these analyzed compounds, 32 VOCs and all three APH fractions were detected in at least one sample. All detected compounds were included as COCs. In addition, to be conservative, separate risk calculations were performed that included compounds not detected in the analyte list as COCs. Risk totals are presented that include: 1) only the detected compounds as COCs, and 2) all analyzed compounds as COCs.

Outdoor air was sampled as well as the indoor locations; the outdoor location was used to evaluate background conditions. Risk calculations were performed on the outdoor location to establish a background risk level. To be conservative, separate risk calculations were performed that: 1) removed the background risk from the total site risk, and; 2) included all COC risk whether or not it had been detected in the background location.

6.2 Exposure Assessment

6.2.1 Site Activities and Uses

The current property use is for mixed commercial purposes including school and child daycare facilities. It is anticipated that the current use of the subject property will remain the same for the reasonably foreseeable future.

6.2.2 Development of Exposure Profiles

Complete and potentially complete exposure pathways were quantitatively evaluated as part of the human health risk characterization. For each identified receptor at each exposure point, complete or potentially complete exposure pathways were identified based on current and future site activities and use and the presence of COCs in various media.

It was assumed that adult workers and children may be exposed to volatile constituents in soil vapor entering the indoor air due to vapor intrusion from residual soil contaminants. Based on site conditions, no exposures related to groundwater were considered as the site groundwater is not used for drinking water purposes and any issues from contaminant volatilization is addressed under the indoor air exposure. No exposures related to soil were considered as there is no direct contact to residual contaminants in soil.

6.2.3 Calculation of Exposure Dose

The exposure dose represents the amount of a COC that an individual receptor may contact. It is a function of receptor-specific exposure assumptions and chemical-specific exposure parameters.

Exposure doses (average daily exposures for inhalation pathways) were calculated. For inhalation exposures, average daily exposures (ADEs) or Lifetime Average Daily Exposure (LADEs) were calculated by normalizing exposure point concentrations (EPCs) with exposure times.

$$\text{ADE (or LADE)} = \frac{\text{Time-weighted exposure concentration for airborne constituents}}{\text{Averaging Period}}$$

Or, more specifically:

$$\text{ADE} = \frac{\text{EPC} \times \text{Exposure Frequency} \times \text{Exposure Duration} \times \text{Exposure Period}}{\text{Averaging Period} \times \text{Conversion Factor}}$$

where:

EPC = Exposure Point Concentration ($\mu g/m^3$)
Exposure Frequency = 12 hours per day
Exposure Duration = 250 days per year
Exposure Period = 7 years
Averaging Period = 7 years
Conversion Factor = (1000 µg/mg) x (8760 hours/year)

And:

$$\text{LADE} = \frac{\text{EPC} \times \text{Exposure Frequency} \times \text{Exposure Duration} \times \text{Exposure Period}}{\text{Lifetime Averaging Period} \times \text{Conversion Factor}}$$

where:

EPC = Exposure Point Concentration ($\mu g/m^3$)
Exposure Frequency = 12 hours per day
Exposure Duration = 250 days per year
Exposure Period = 30 years
Lifetime Averaging Period = 70 years
Conversion Factor = 8760 hours/year

ADEs were calculated for evaluation of non-carcinogenic effects associated with short-term exposures (i.e., less than 10 percent of a lifetime, or seven years). Chronic LADEs were calculated for the evaluation of carcinogenic effects that occur over a time period of 30 years. The exposure frequency of 12 hours per day and exposure duration of 250 days per year are assumed to be overly conservative. The duration assumes a school or daycare child or worker will be present for five days per week (Monday thru Friday) for a total of 50 weeks of the year. The frequency assumes the child or worker will be present for up to 12 hours each day, which is typically much more than the standard 8 hour per day commercial scenario. It is understood that some child day cares are open more than 8 hours per day and children can be present at these day cares for up to 12 hours per day.

6.2.4 Exposure Points and Exposure Point Concentrations

The exposure point concentration (EPC) provides an estimate of the constituent concentration that a receptor would potentially contact at an exposure point over the period of exposure. EPCs were based on the maximum concentrations detected in indoor air (samples collected in September 2012 and February 2013). Refer to **Table 1** for the summary of the air sampling results. Given the separate indoor sampling locations were located within three different buildings and the possibility that vapor intrusion could be occurring in any one or all of the spaces, separate EPCs were determined at each of the five sampling locations. Individual maximum concentrations were determined in each of the sampled locations. These concentrations are documented in **Tables 3-7**. For each location, two sets of EPCs were established: one set of EPCs represent the maximum concentrations of detected compounds only; and the second set of EPCs represents all compounds analyzed and if a compound was not detected, the EPC value represents one-half of the analytical detection limit.

6.3 Dose-Response Assessment

The dose-response assessment describes the observed effects in humans and/or laboratory animals associated with particular exposures of COCs. Toxicity information is used to quantitatively characterize the relationship between the dose of a constituent and the incidence of adverse health effects in an exposed population. EPA has published chemical-specific Reference Concentrations (RfCs) for inhalation threshold effects, and Cancer Unit Risk factors for inhalation non-threshold effects. These values are presented in **Table 2**. These toxicity values are among those developed by MassDEP for use in Method 3 risk characterization (310 CMR 40.0993). Toxicity values used by MassDEP for the COCs were obtained from MassDEP Shortforms and are presented in **Table 2**.

EPA does not have published values for petroleum hydrocarbons, but instead relies on individual chemical compounds contained in petroleum, such as hexane, heptane, and trimethylbenzenes. This is in contrast to MassDEP, which evaluates petroleum hydrocarbons as a group and does not include individual risk evaluations for compounds such as those listed above. To evaluate the potential risk of harm posed by petroleum hydrocarbons in indoor air at the site, dose-response values were assigned by MassDEP to each range of hydrocarbon fractions detected via APH analysis (C_5 to C_8 Aliphatics, C_9 to C_{12} Aliphatics, and C_9 to C_{10} Aromatics). The MassDEP has published RfCs

based on toxicity studies with representative compounds or mixtures containing the aliphatic and aromatic hydrocarbon fraction. RfCs for n-hexane, petroleum fractions, and pyrene were used to evaluate risks posed by the presence of petroleum hydrocarbons in site media. Per MassDEP guidance (November 2003), n-hexane, C_9-C_{17} fractions, and mineral oils were selected as the representative compounds for the C_5 to C_8, C_9 to C_{18}, and C_{19} to C_{36} carbon range aliphatic fractions, respectively; pyrene was selected to represent the aromatic fraction in the carbon range of C_9 to C_{22}.

6.4 Characterization Of Risk Of Harm To Human Health

The risk characterization for the site focused on reasonably conservative scenarios for current and foreseeable future exposures under current conditions of OHM distribution. For the human receptor, cumulative noncancer risks were calculated. To evaluate potential noncancer effects, hazard quotients (HQs) were calculated by comparing estimated average daily exposures (ADEs) to RfCs. To evaluate potential cancer effects, excess lifetime cancer risk (ELCR) estimates (increased probability relative to background probability that an individual will develop cancer over a lifetime of exposure) were estimated by applying unit risks to LADEs. The estimated noncancer and cancer risks were compared to the EPA or MassDEP risk management criteria. The result of these comparisons was used to evaluate whether a condition of no significant risk (NSR) of harm to human health has been achieved at the site.

6.4.1 Methodology

To evaluate noncarcinogenic risks, a HQ was calculated. The HQ, a ratio of the receptor's quantified exposure and the "acceptable" level of exposure, provides a general indication of whether exposures are likely to result in adverse health effects, but does not represent the severity of effects associated with an exposure. To evaluate the noncarcinogenic effects for each OHM, the estimated ADE was divided by the appropriate RfC to yield a HQ:

$$HQ_{inhalation} = ADE\ (mg/m^3)/RfC\ (mg/m^3)$$

For multiple chemical exposures, HQs for each COC were summed to yield a cumulative hazard index (HI). A cumulative HI equal to 1.0, the Cumulative Noncancer Risk Limit, indicates that a receptor's exposure is equal to the "acceptable" exposure level and it is considered unlikely that adverse health effects would occur. However, a cumulative HI greater than 1.0 does not imply that adverse health effects would necessarily be expected. The appropriateness of the exposure assumptions and the basis of the toxicity values used in calculation of the risk must also be considered. [1]

Carcinogenic risks were evaluated as probabilities. The ELCR estimate is considered to be an upper bound probability of the likelihood of developing cancer as a result of exposure to

[1] This approach assumes that toxic effects by different chemicals are additive. Consequently, the application of this approach to a mixture of compounds that are not expected to induce the same type of effects or which affect different systems or organs could overestimate the probable risk. Therefore, if the HI for an individual exposure pathway or exposure group (i.e., the approach which assumes complete additivity of effects) exceeded 1.0, then HIs can be segregated by toxicity endpoint.

individual chemicals. To assess excess lifetime cancer risks, the LADEs were multiplied by their unit risks to yield a COC-specific lifetime cancer risk estimate:

$$ELCR_{inhalation} = LADE\ (mg/m3) \times unit\ risk\ (mg/m3)^{-1}$$

For multiple chemical exposures, COC-specific cancer risk estimates were summed to yield a cumulative receptor cancer risk estimate.[2] The calculated cumulative receptor cancer risk estimates were compared to the Cumulative Cancer Risk Limit of 1 x 10-5 specified by the EPA and MassDEP and in accordance with the project QAPP.

6.4.2 Cumulative Hazard Estimates

Individual chemical and cumulative hazard estimates for each sampling location are presented in **Tables 3-7**. Cumulative hazards for all locations are summarized in **Table 8**. Estimates were combined to yield Cumulative Cancer Risk and Noncancer Hazard estimates. Estimates were calculated separately using both EPA and MassDEP values for unit risks and RfCs to evaluate if there is a substantial difference in methodology. To be conservative, separate risk calculations were performed that included compounds not detected in the analyte list as COCs. Risk totals are presented that include only the detected compounds as COCs, and all analyzed compounds as COCs. Risk calculations were performed on the outdoor location to establish a background risk level. To be conservative, separate risk calculations were performed that both removed the background risk from the total site risk and included all COC risk whether or not it had been detected in the background location. Due to the conservative nature of the exposure assumptions used in this risk characterization, actual risks are likely to be less than those calculated.

In summary, with regard to cumulative HI, the only location with a cumulative HI greater than 1.0 was Suite 157-J in Building 100. While there was a difference in cumulative HI for the various scenarios, all risk scenarios showed a cumulative HI greater than 1.0 for this location (including scenarios calculated with EPA and MassDEP reference concentrations, with and without background effects included, and with and without non-detected compounds included). The elevated HI is directly related to the presence of petroleum hydrocarbons. Nearly all of the cumulative HI in Suite 157-J is a result of the detected concentrations of 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene (for the EPA risk calculation) and the detected concentrations of all three petroleum hydrocarbon fractions in the APH analysis (for the MassDEP risk calculation).

Cancer risk did not exceed 1E-05 for any location when non-detected compounds were not included in the risk total or when background levels were considered (even with non-detected compounds included in the risk total).

[2] The summation assumes that individual intakes are small. It also assumes independence of action by the compounds involved (i.e., there are no synergistic or antagonistic interactions, and all chemicals have the same toxicological mechanism and endpoint).

When including cancer risk for non-detected compounds using the EPA cancer slope factors, three non-detected compounds are responsible for the majority of the risk; 1,2-dibromoethane, benzyl chloride, and vinyl bromide result in a combined cancer risk of 1.26E-05 when using one-half their analytical detection limits as the EPC as shown in **Table 3** through **Table 7**. Under this scenario, the cumulative cancer risk exceeded 1E-05 for all four indoor locations as well as the outdoor background sample. Therefore, the inclusion of the non-detected compounds in this manner is not considered to provide a usable estimation of site risk.

6.5 Uncertainties Analysis

The findings of the human health risk characterization are dependent on a number of factors including, but not limited to, the representation and quality of the data collected to describe site conditions, the nature and extent of COCs, and the assumptions made to evaluate potential risks for receptors potentially exposed to COCs in site media. Uncertainty may be introduced in each component of the risk characterization process. Although the magnitude of uncertainty has not been quantified for this site, the primary sources of uncertainty in the characterization of OHM, exposure assessment, dose-response assessment, and risk characterization are qualitatively discussed below.

6.5.1 Characterization of OHM

Indoor air data collected in September 2012 and February 2013 were used to characterize exposure and potential hazards for identified receptors under current and reasonably foreseeable site activities and uses. The EPCs used in the evaluation for indoor air were based on the maximum concentrations from indoor air samples collected at each sampling location.

Surrogate compounds were used to represent the aromatic and aliphatic fractions of petroleum hydrocarbons detected at the site, although these surrogate chemicals may not actually be present. Although this approach introduces uncertainty into the analysis, it overestimates potential risks since, per MassDEP methodology, petroleum hydrocarbons were evaluated using surrogates associated with the highest toxicity.

6.5.2 Exposure Assessment

Estimation of EPCs, characterization of current and reasonably foreseeable site activities and uses, and calculation of daily doses contribute most to the uncertainty in the exposure assessment component of the risk characterization. To counter this uncertainty, health-protective exposure assumptions, based on either site-specific information or conservative default values provided in the MassDEP or EPA guidance, were used to quantitatively evaluate potential risks posed by the site.

In calculating receptor-specific exposure factors for the quantitatively evaluated scenarios, the most health-protective of the default range of values available were used. Receptor-specific parameters, such as contact and ingestion rates selected for the human health risk assessment, were obtained from the MassDEP guidance, which are intended to err on the side of protecting human health.

6.5.3 Dose-Response Assessment

The primary sources of uncertainty associated with the toxicity values used to quantify risks include: (1) extrapolation of dose-response information from effects observed at high doses to predict adverse effects at low levels anticipated for human exposure to environmental constituents; (2) use of toxicity information compiled from short-term exposure studies to predict the effects associated with long-term exposures (and vice versa); (3) use of dose-response information from animal studies to predict likely effects in humans; and (4) use of toxicity information based on homogeneous animal populations or healthy human populations to predict the effects that are likely to be observed in the general population (including sensitive subgroups).

The dose-response values used in the calculation of non-cancer risk estimates are conservative values. Since RfCs are derived using a number of safety factors and are developed to protect sensitive populations, the actual concentration associated with a health effect is likely to be higher than the dose or concentration established by the EPA or by the MassDEP for most groups in the general population.

Dose-response values for surrogate compounds (e.g. hexane and pyrene) selected by the MassDEP to represent certain fractions (i.e., aliphatic and aromatic) of a petroleum hydrocarbon mixture were used to assess risks associated with exposure to APH detected in air samples from the site. The alternate RfCs presented by the MassDEP were used as conservative RfCs for the fractions of aliphatic and aromatic hydrocarbons identified by APH analysis. These surrogates typically represent the most toxic chemicals for each of these fractions and hence, are likely to lead to overestimates of risk.

Important sources of uncertainty in the risk characterization include:

- the equal weight given to chemical constituents whose RfCs have different confidence levels in estimating noncarcinogenic HIs; and
- the assumption of simple additivity of risks across COCs.

As with the evaluation of EPCs, the use of conservative assumptions and parameters in developing risk estimates would be expected to err on the side of protecting human health. Thus, the calculated risk estimates are likely to result in upperbound estimates of the hazard resulting from exposure to COCs. Consequently, the estimates should be used to highlight areas of potential concern and to assist in providing practical risk management information, rather than as absolute estimates of health risks.

6.5.4 Risk Characterization

As evidenced by the number of risk estimates in **Table 8**, risk was calculated using various methods, some more conservative than others. Separate risk estimates were calculated including and not including compounds which were not detected in the analysis. When calculating risk for

individual compounds not detected, the EPC for that compound was one-half of the analytical detection limit. As one would expect, the risk for a given location (not including background considerations) was higher when non detected compounds were included. In some cases, the risk increased by a factor of 10 when including non detected compounds in the analysis. Risk evaluations do not typically include non detected compounds, so their inclusion in the estimates represents an overestimation of risk. As these compound values could not be quantified, the use of one-half of the detection limit can greatly overestimate risk since it is unclear if these compounds are present at any concentration at the site.

Additionally, estimates were prepared for both the inclusion and removal of background concentration-related risk. For each location, risk was calculated under the assumption that all COCs were due to vapor intrusion and/or indoor sources. However, a risk to outdoor background air was also determined and risk was also calculated at each indoor location taking the background risk into account by subtracting the background risk from the indoor risk value. Not including background effects greatly overestimates risk and does not allow for a determination of the impacts on the indoor air quality directly resulting from the vapor intrusion of the chemicals historically released on site. Other sources of indoor air impacts (indoor and outdoor sources) may greatly affect the overall risk estimates.

7.0 CORRECTIVE ACTIONS

No corrective measures were necessary in regard to the field collection of samples. A corrective measure was required during the laboratory analysis. As detailed in the Data Validation Memo for the September 2012 sampling event, the full TO-15 analyte list as designated in the QAPP was not initially performed; only those compounds using TO-15 SIM were reported. 20 additional compounds that could be performed using TO-15 only were not quantified. GEOSPHERE requested that as many of these additional compounds be quantified using the existing scans and chromotograms. A subsequent laboratory report was issued, which included the quantification of 14 additional compounds. Six compounds (1,4-dioxane, 3-chloropropene, benzyl chloride, n-heptane, vinyl acetate, and vinyl bromide) could not be quantified in this way and are listed as Not Analyzed in **Table 1**.

Also, as detailed in the Data Validation Memo for the February 2013 sampling event, the initial laboratory report did not include the quantification of six compounds (1,4-dioxane, 3-chloropropene, benzyl chloride, n-heptane, vinyl acetate, and vinyl bromide) from the TO-15 analyte. A subsequent laboratory report was issued, which included the quantification of these compounds.

8.0 CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the risk characterization, the results were mostly consistent regardless of whether EPA or MassDEP risk factors were utilized. For excess lifetime cancer risk, there appears to be no significant risk in any of the sampling locations. Significant cancer risk was calculated in only one scenario (using EPA cancer slope factors) where all compounds (even those not detected) were included in the evaluation and background levels were not considered. Under that scenario, the majority of the cancer risk was from three *undetected* compounds (1,2-dibromoethane, benzyl chloride, and vinyl bromide). Even the outdoor background sample had a calculated significant cancer risk under this scenario. When undetected compounds are excluded from the risk calculations (using standard risk characterization methodology), no significant cancer risk was calculated at any of the sampling locations. The overall conclusion is that no excess cancer risk exists in any of the sampling locations, regardless of whether the source of the detected contaminants is related to vapor intrusion, interior sources, exterior background air, or a combination of any of these.

For the non-carcinogenic hazard index, the risk characterization results across the various calculated scenarios were even more consistent regardless of whether EPA or MassDEP risk factors were utilized, undetected compounds were included in the risk calculations, or whether exterior background was considered. Under all evaluated scenarios, there was no elevated hazard index for Suite 149-J in Building 100, Suite 1000 in Building 500, Suite 171-X in Building 600 or in the exterior background sample. There was an elevated hazard index for Suite 157-J in Building 100 for all evaluated scenarios. Nearly all of the cumulative hazard index in Suite 157-J was the result of the concentrations of 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene (for the EPA risk calculation) and the concentrations of all three petroleum hydrocarbon fractions in the APH analysis (for the MassDEP risk calculation). 1,2,4-trimethylbenzene and 1,3,5-trimethylbenzene are compounds typically found in petroleum hydrocarbons; MassDEP does not quantify them individually for risk purposes since their presence in already included with the risk of the APH.

When evaluating the data in Suite 157-J for both the September 2012 and February 2013 sampling events, elevated concentrations of APH and the trimethylbenzenes were detected in both sampling events. The conclusion from this assessment is that airborne petroleum hydrocarbons are present in Suite 157-J that could be considered to be potential significant risk concern, based on the calculation methodology used for this assessment. Given that the exterior background samples had little to no detection of APH or the trimethylbenzenes, the source of the petroleum hydrocarbons is not suspected to be coming from the outside. Remaining suspected sources of the petroleum hydrocarbons would be either interior source(s) within the suite space or vapor intrusion from the previous USM operations.

Based on the USM historic site assessment and remediation, it appears unlikely that the elevated petroleum hydrocarbons in Suite 157-J are related to vapor intrusion from previous USM operations. Suite 149-J is more closely located to the historic remediation area than Suite 157-J and one would suspect that vapor intrusion would be more likely in Suite 149-J, yet no elevated

compounds were detected there. In fact, Suite 157-J (located on the northeast portion of Building 100) is located within the site area that (as reported in the 1991 Phase II Site Assessment report) overall had a significantly lower presence of site contaminants than in areas to the south and west. The primary remediation areas were between Buildings 800 and 900 and adjacent to the Lower Shoe Pond, as shown in **Figure 3**.

It would therefore be more likely that the petroleum hydrocarbons detected in Suite 157-J are from an interior source located within the space. While there was no evidence of storage of petroleum compounds during the pre-screening assessment in September 2012 in Suite 157-J, there are multiple commercial products that, if present at the space, could have resulted in the elevated levels detected in the air samples. For instance, the presence of cigarette smoke-related compounds on workers' clothing could result in hydrocarbon detection in the air samples.

No further actions are recommended in Suite 149-J in Building 100, Suite 1000 in Building 500, or Suite 171-X in Building 600. It is recommended that a more thorough inventory of the Suite 157-J space be made and that workers be interviewed to evaluate the potential presence of one or more interior sources of petroleum hydrocarbons. Any such potential sources should be removed from the space, and after removal, additional air sampling should be performed to evaluate the concentrations of petroleum hydrocarbons. Should additional information verify that the elevated petroleum hydrocarbons are not related to vapor intrusion, than no additional actions would be required in Suite 157-J.

Figures

SITE COORDINATES
Longitude: -70.8871 W
Lattitude: 42.5596 N
UTM 4,713,634m N
345,086m E

0 1,000 2,000 4,000 6,000 Feet

Approximate Scale: 1 inch = 2,000 feet (1:24,000)

N
W E
S

Figure 1 - Locus Plan

Former United Shoe Machinery North Parcel
181 Elliott Street
Beverly, MA

Project Number: 12201
Client: Cummings

Created By: EAF Date: 03/15/12
Checked By: BH Date: 03/15/12

Reference: MassGIS USGS Quadrangle: SALEM and MARBLEHEAD NORTH
Image: M/12201_Beverly/2012/Figures

GEOSPHERE
ENVIRONMENTAL MANAGEMENT INC.
51 Portsmouth Ave. - Exeter, NH 03833 - (603) 773-0075

Figure 2 - Site Plan

Former United Shoe
Machinery North Parcel
181 Elliott Street
Beverly, MA

LEGEND

Site Bound

N E S W

0 150 300 600
Feet

Approximate Scale: 1 inch = 300 feet

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Project Number: 12201
Client: Cummings

Created By: EAF Date: 03/15/12
Checked By: BAH Date: 03/15/12

Reference: MassGIS 2008 15CM Orthophotos
Image: M/12201_Beverly/2012/Figures

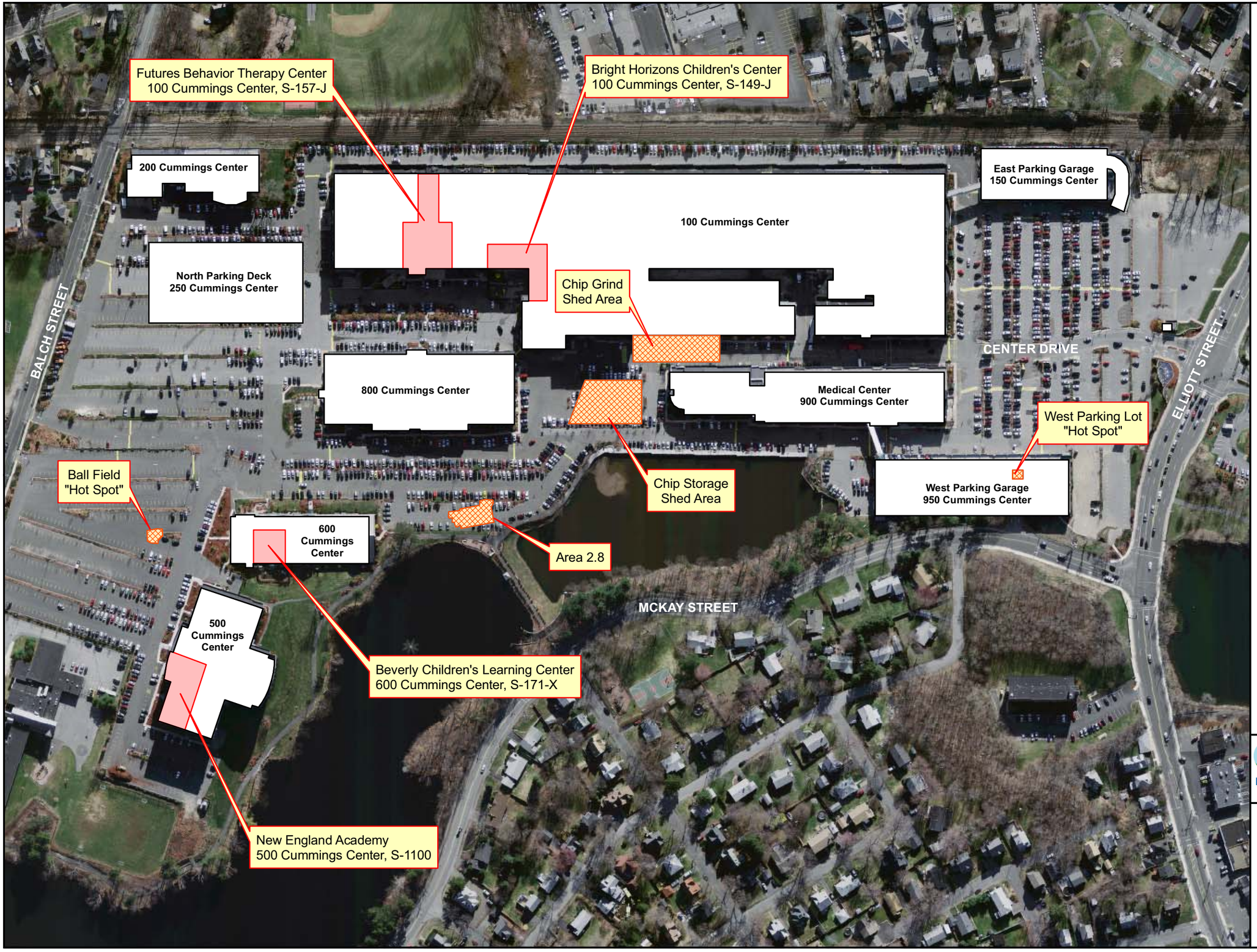
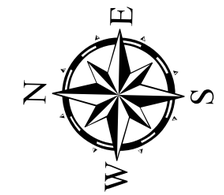


Figure 3
Building Areas Used As Child Day Care Centers Or Schools

Former United Shoe Machinery North Parcel
131 Elliott Street
Beverly, MA

LEGEND

- DAY CARE OR SCHOOL
- SOIL REMEDIATION AREA
- BUILDING



0 100 200 400 Feet

Approximate Scale: 1 inch = 200 feet

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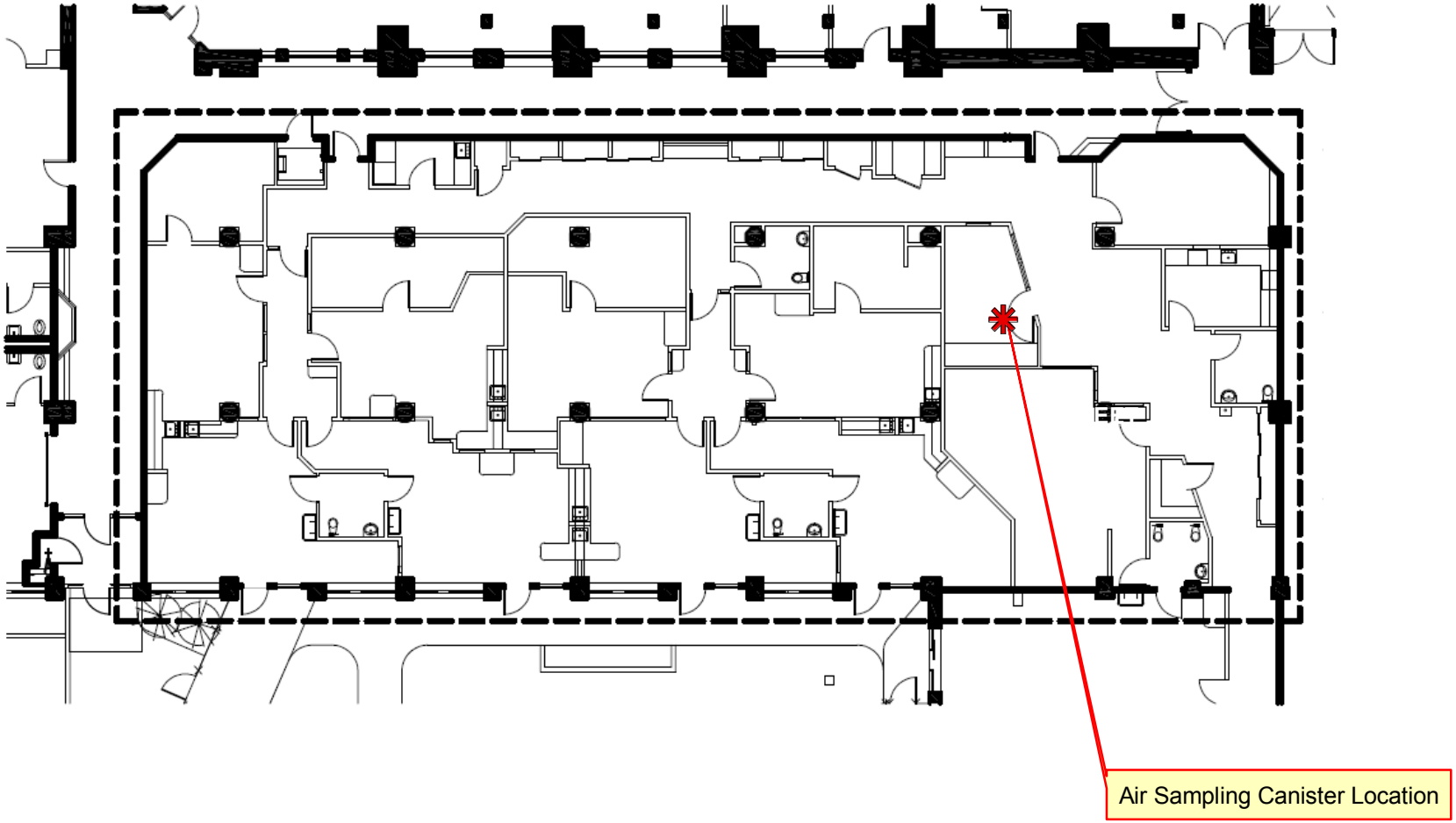
Client: Cummings

Created By: EAF Date: 03/15/12
Modified By: AF Date: 04/15/13
Checked By: BAH Date: 04/15/13

Reference: MassGIS 2008 15CM Orthophotos
Image: M/12201_Beverly/2013/Figures

Figure 4
Air Sampling Location

Bright Horizons Children's Center
100 Cummings Center
(S-149-J)



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Project Number: 12201
Client: Cummings

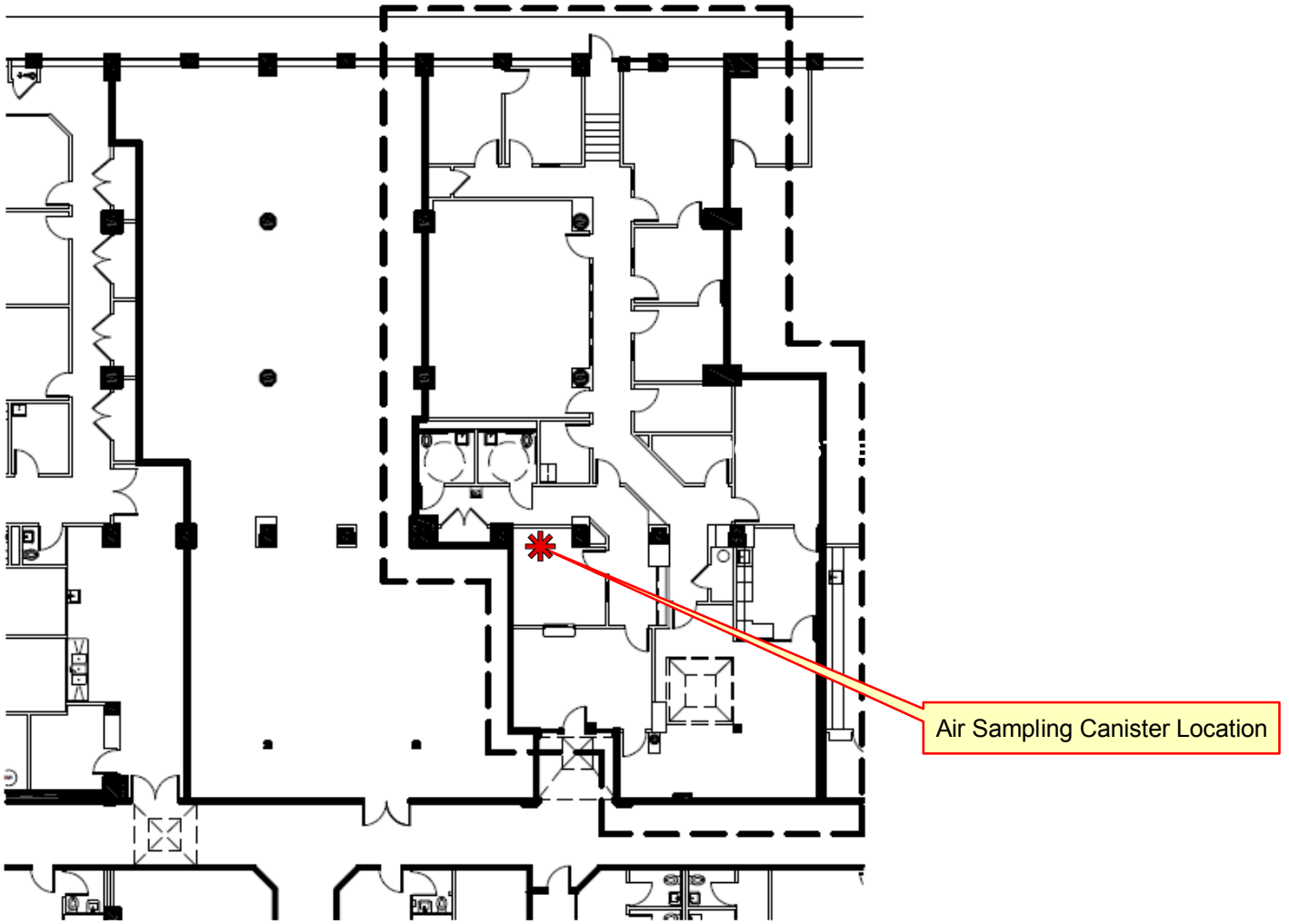
Created By: AF Date: 11/7/12
Checked By: BAH Date: 11/8/2012

0 5' 10' 20' 40'

Reference:
Cummings Properties,
Engineering Plans, 02/25/08

Figure 5
Air Sampling Location

Futures Behavior Therapy Center
100 Cummings Center
(S-157-J)



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Project Number: 12201
Client: Cummings

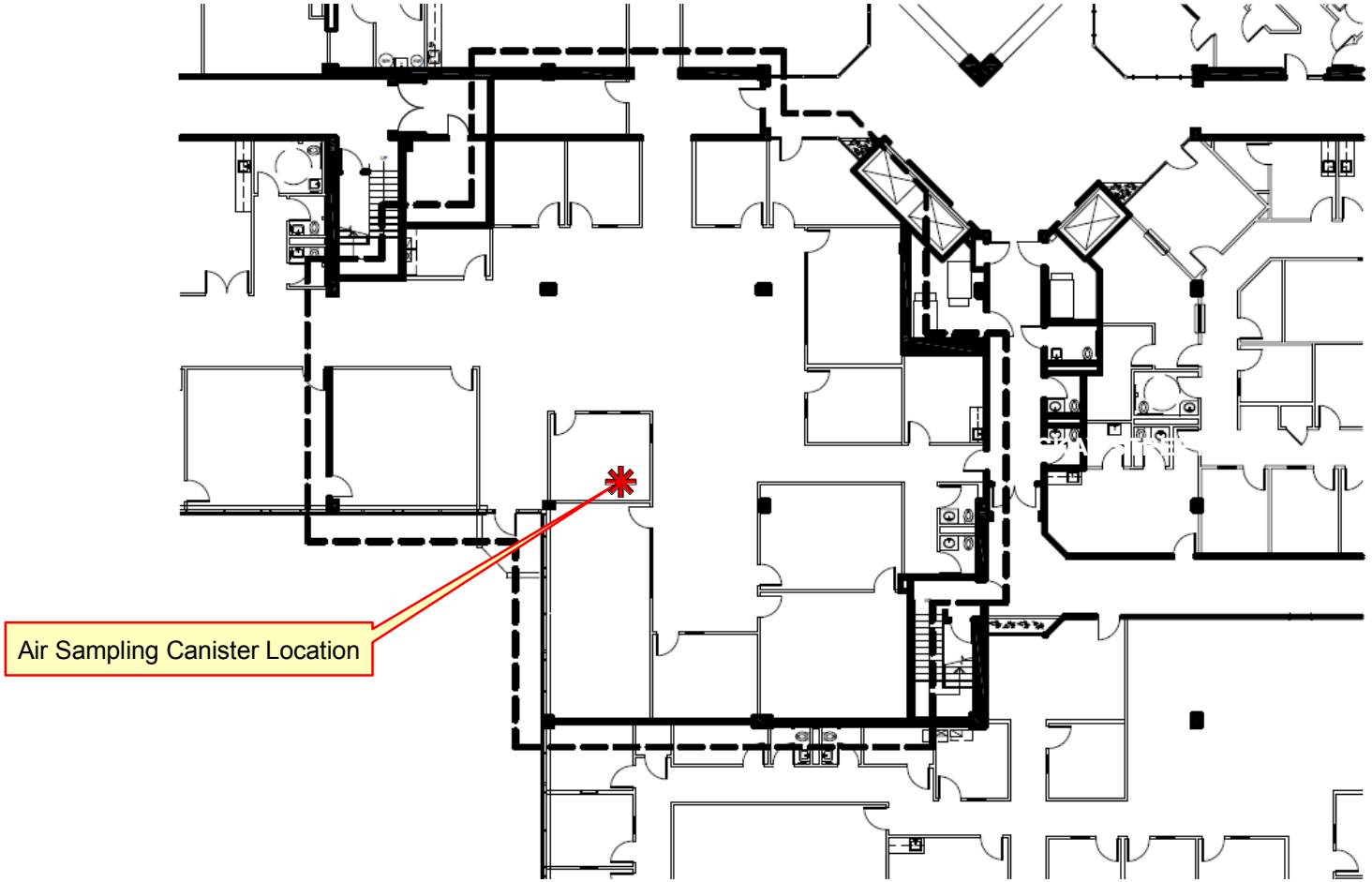
Created By: AF Date: 11/7/12
Checked By: BAH Date: 11/8/2012

0 5' 10' 20' 40'

Reference:
Cummings Properties,
Engineering Plans, 05/27/2009

Figure 6
Air Sampling Location

New England Academy
500 Cummings Center
(S-1100)



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Project Number: 12201
Client: Cummings

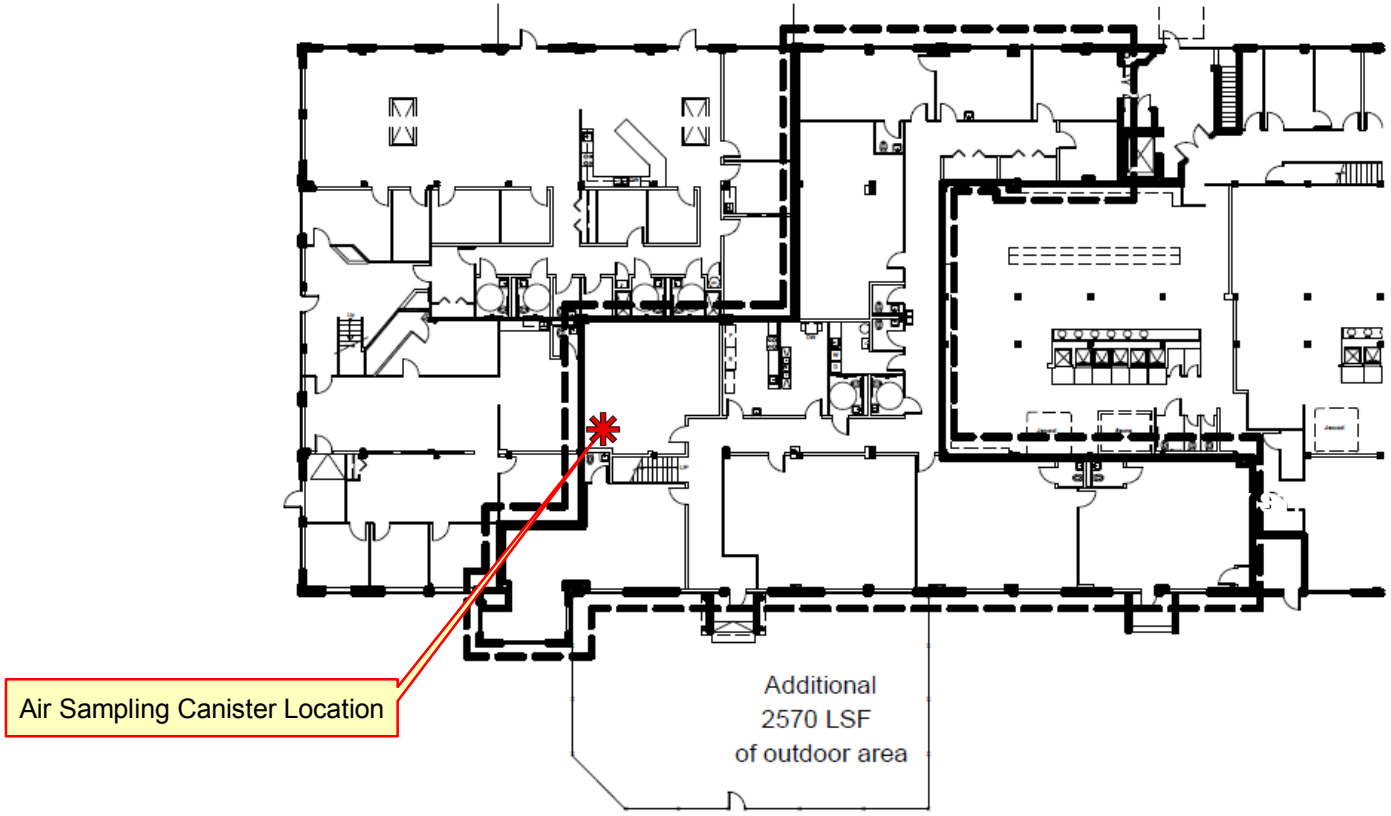
Created By: AF Date: 11/7/12
Checked By: BAH Date: 11/8/2012

0 5' 10' 20' 40'

Reference:
Cummings Properties,
Engineering Plans, 01/11/08

Figure 7
Air Sampling Location

Beverly Children's Learning Center
600 Cummings Center
(S-171-X)



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Project Number: 12201
Client: Cummings

Created By: AF Date: 11/7/12
Checked By: BAH Date: 11/8/2012

Reference:
Cummings Properties,
Engineering Plans, 04/09/08

Tables

TABLE 1

Indoor Air Chemical Analysis Results
Cummings Center, Beverly, MA
September 2012 and February 2013

Sample ID	S-149-J	S-149-J Duplicate	S-149-J	S-149-J Duplicate	S-157-J	S-157-J	S-1100	S-1100	S-171-X
Sample Location	Building 100 Interior, Suite 149-J	Building 100 Interior, Suite 149-J	Building 100 Interior, Suite 149-J	Building 100 Interior, Suite 149-J	Building 100 Interior, Suite 157-J	Building 100 Interior, Suite 157-J	Building 500 Interior, Suite 1100	Building 500 Interior, Suite 1100	Building 600 Interior, Suite 171-X
Sample Type	Air	Air	Air	Air	Air	Air	Air	Air	Air
Date Sampled	9/20/2012 to 9/21/2012	9/20/2012 to 9/21/2012	2/4/2013 to 2/5/2013	2/4/2013 to 2/5/2013	9/20/2012 to 9/21/2012	2/4/2013 to 2/5/2013	9/20/2012 to 9/21/2012	2/4/2013 to 2/5/2013	9/20/2012 to 9/21/2012
Volatile Organic Compounds (µg/m3)									
1,1,1-trichloroethane	**0.114**	**0.114**	**0.207**	**0.196**	<0.109	**0.109**	<0.109	<0.109	<0.109
1,1,1,2-tetrachloroethane	<0.137	<0.137	<0.137	<0.137	<0.137	<0.137	<0.137	<0.137	<0.137
1,1,2,2-tetrachloroethane	<0.137	<0.137	<0.137	<0.137	<0.137	<0.137	<0.137	<0.137	<0.137
1,1,2-trichloroethane	<0.109	<0.109	<0.109	<0.109	<0.109	<0.109	<0.109	<0.109	<0.109
1,1-dichloroethane	<0.081	<0.081	<0.081	<0.081	<0.081	<0.081	<0.081	<0.081	<0.081
1,1-dichloroethene	<0.079	<0.079	<0.079	<0.079	<0.079	<0.079	<0.079	<0.079	<0.079
1,2,4-trichlorobenzene	<0.371	<0.371	<0.371	<0.371	<0.371	<0.371	<0.371	<0.371	<0.371
1,2,4-trimethylbenzene	**2.55**	**2.56**	**0.575**	**0.123**	**19.8**	**54.6**	**0.231**	**0.329**	**0.202**
1,2-dibromoethane	<0.154	<0.154	<0.154	<0.154	<0.154	<0.154	<0.154	<0.154	<0.154
1,2-dichlorobenzene	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12
1,2-dichloroethane	**0.166**	**0.162**	**0.105**	**0.093**	**0.227**	**0.093**	<0.081	0.154	**0.15**
1,2-dichloropropane	<0.092	<0.092	<0.092	<0.092	<0.092	<0.092	<0.092	<0.092	<0.092
1,3,5-trimethylbenzene	**0.792**	**0.801**	**0.172**	<0.098	**5.21**	**13.5**	<0.098	<0.098	<0.098
1,3-butadiene	**0.055**	**0.064**	<0.044	<0.044	**0.058**	**0.051**	<0.044	<0.044	<0.044
1,3-dichlorobenzene	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12
1,4-dichlorobenzene	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12	<0.12
1,4-dioxane	NA	NA	<0.721	<0.721	NA	<0.721	NA	<0.721	NA
2,2,4-trimethylpentane	<0.934	<0.934	<0.934	<0.934	<0.934	<0.934	<0.934	<0.934	<0.934
2-butanone	**1.64**	**1.52**	**1.07**	<0.590	**2.04**	**1.04**	**1.23**	**1.15**	**1.51**
2-hexanone	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82	<0.82
3-chloropropene	NA	NA	<0.626	<0.626	NA	<0.626	NA	<0.626	NA
4-Ethyltoluene	<0.983	<0.983	<0.983	<0.983	**4.56**	**12.4**	<0.983	<0.983	<0.983
Acetone	**68.9**	**55.8**	**22.4**	**12.2**	**70.8**	**51.3**	**19.7**	**18.3**	**33**
Benzene	**0.396**	**0.386**	**0.585**	**0.514**	**0.323**	**0.696**	<0.319	0.486	**0.319**
Benzyl Chloride	NA	NA	<1.04	<1.04	NA	<1.04	NA	<1.04	NA
Bromodichloromethane	**0.141**	**0.147**	**0.141**	<0.134	<0.134	<0.134	<0.134	<0.134	<0.134
Bromoform	<0.207	<0.207	<0.207	<0.207	<0.207	<0.207	<0.207	<0.207	<0.207
Bromomethane	<0.078	<0.078	<0.078	<0.078	<0.078	<0.078	<0.078	<0.078	<0.078
Carbon disulfide	<0.623	<0.623	<0.623	<0.623	<0.623	<0.623	<0.623	<0.623	<0.623
Carbon tetrachloride	**0.321**	**0.321**	**0.591**	**0.56**	**0.302**	**0.572**	**0.314**	**0.566**	**0.302**
Chlorobenzene	<0.092	<0.092	<0.092	<0.092	<0.092	<0.092	<0.092	<0.092	<0.092
Chloroethane	<0.053	<0.053	<0.053	<0.053	<0.053	<0.053	<0.053	<0.053	<0.053
Chloroform	**0.796**	**0.796**	**0.449**	**0.42**	**0.596**	**0.288**	**0.425**	**0.381**	**0.762**
Chloromethane	<1.03	<1.03	**1.03**	<1.03	<1.03	<1.03	<1.03	**1.36 E**	<1.03
Cis-1,2-dichloroethene	<0.078	<0.078	<0.079	<0.079	**0.123**	**0.131**	<0.079	<0.079	<0.079
Cis-1,3-dichloropropene	<0.091	<0.091	<0.091	<0.091	<0.091	<0.091	<0.091	<0.091	<0.091
Cyclohexane	<0.688	<0.688	<0.688	<0.688	**56.4**	<0.688	<0.688	<0.688	<0.688
Dibromochloromethane	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17	<0.17
Dichlorodifluoromethane	**0.846**	**1.14**	**2.35**	**2.25**	**0.737**	**2.21**	**0.756**	**2.88**	**0.855**
Ethanol	**228**	**187**	**266**	**173**	**511**	**115**	**324**	**384**	**439**
Ethyl acetate	<1.80	<1.80	<1.80	<1.80	<1.80	<1.80	<1.80	<1.80	<1.80
Ethylbenzene	**0.452**	**0.443**	**0.291**	**0.174**	**0.586**	**0.964**	**0.2**	**0.117**	**0.217**
Freon-113	**0.475**	**0.483**	**0.491**	**0.491**	**0.498**	**0.491**	**0.498**	**0.628**	**0.483**
Freon-114	<0.349	<0.349	<0.349	<0.349	<0.349	<0.349	<0.349	<0.349	<0.349
Hexachlorobutadiene	<0.533	<0.533	<0.533	<0.533	<0.533	<0.533	<0.533	<0.533	<0.533
Hexane	**1.07**	**1.88**	**0.814**	**0.737**	**4.3**	**0.747**	**1.12**	<0.705	<0.705
Isopropyl alcohol	**152**	**118**	**137**	**53.8**	**235 E**	**396 E**	**42.5**	**79.4**	**92.9**
Methylene chloride	<4.86	<4.86	<4.86	<4.86	**10.5**	<4.86	**6.91**	<4.86	<4.86
MIBK	<0.82	<0.82	<0.82	<0.82	**1.17**	<0.82	<0.82	<0.82	<0.82
MTBE	<0.072	<0.072	<0.072	<0.072	<0.072	<0.072	<0.072	<0.072	<0.072
M+p-xylene	**1.63**	**1.61**	**0.903**	**0.46**	**1.71**	**3.21**	**0.526**	**0.269**	**0.53**
n-heptane	NA	NA	<0.820	<0.820	NA	<0.820	NA	<0.820	NA
Naphthalene	NA	NA	<0.262	<0.262	NA	**0.367**	NA	<0.262	NA
o-xylene	**0.725**	**0.721**	**0.395**	**0.28**	**0.96**	**2.34**	**0.191**	**0.113**	**0.23**
Propylene	<0.86	<0.86	<0.861	<0.861	<0.86	<0.861	<0.86	<0.861	<0.86
Styrene	**1.06**	**1.09**	**0.353**	<0.085	**0.588**	**0.379**	**0.132**	**0.102**	**0.409**
Tetrachloroethylene	**0.468**	**0.237**	<0.136	<0.136	**0.312**	**0.183**	**0.258**	<0.136	**0.21**

TABLE 1

Indoor Air Chemical Analysis Results
Cummings Center, Beverly, MA
September 2012 and February 2013

Sample ID	S-149-J	S-149-J Duplicate	S-149-J	S-149-J Duplicate	S-157-J	S-157-J	S-1100	S-1100	S-171-X
Sample Location	Building 100 Interior, Suite 149-J	Building 100 Interior, Suite 149-J	Building 100 Interior, Suite 149-J	Building 100 Interior, Suite 149-J	Building 100 Interior, Suite 157-J	Building 100 Interior, Suite 157-J	Building 500 Interior, Suite 1100	Building 500 Interior, Suite 1100	Building 600 Interior, Suite 171-X
Sample Type	Air	Air	Air	Air	Air	Air	Air	Air	Air
Date Sampled	9/20/2012 to 9/21/2012	9/20/2012 to 9/21/2012	2/4/2013 to 2/5/2013	2/4/2013 to 2/5/2013	9/20/2012 to 9/21/2012	2/4/2013 to 2/5/2013	9/20/2012 to 9/21/2012	2/4/2013 to 2/5/2013	9/20/2012 to 9/21/2012
Volatile Organic Compounds (µg/m3)									
Tetrahydrofuran	<0.59	<0.59	<0.59	<0.59	<0.59	<0.59	**0.669**	<0.59	<0.59
Toluene	**3.18**	**3.06**	**1.09**	**0.837**	**2.67**	**2.51**	**2.8**	**0.863**	**1.32**
Trans-1,2-dichloroethene	<0.079	<0.079	<0.079	<0.079	<0.079	<0.079	<0.079	<0.079	<0.079
Trans-1,3-dichloropropene	<0.091	<0.091	<0.091	<0.091	<0.091	<0.091	<0.091	<0.091	<0.091
Trichloroethene	<0.107	<0.107	<0.107	<0.107	<0.107	<0.107	<0.107	<0.107	<0.107
Trichlorofluoromethane	**1.02**	**1.04**	**1.24**	**1.23**	**1.15**	**1.26**	**1.08**	**1.59**	**1.08**
Vinyl acetate	NA	NA	<0.704	<0.704	NA	<0.704	NA	<0.704	NA
Vinyl bromide	NA	NA	<0.874	<0.874	NA	<0.874	NA	<0.874	NA
Vinyl chloride	<0.051	<0.051	<0.051	<0.051	<0.051	<0.051	<0.051	<0.051	<0.051
Air-Phase Petroleum Hydrocarbon Target Analytes - APH (µg/m3)									
1,3-Butadiene	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Methyl-tert-butyl ether	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Benzene	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Toluene	**2.9**	**2.9**	<2.0	<2.0	**2.3**	**2.5**	**2.4**	<2.0	<2.0
Ethylbenzene	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
m- & p- Xylenes	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0	<4.0
o-Xylenes	<2.0	<2.0	<2.0	<2.0	<2.0	**2.3**	<2.0	<2.0	<2.0
Naphthalene	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0	<2.0
Air-Phase Petroleum Hydrocarbons - APH (µg/m3)									
C_5-C_8 Aliphatic Hydrocarbons	**110**	**110**	**24**	**16**	**320**	**41**	**39**	**18**	**100**
C_9-C_{12} Aliphatic Hydrocarbons	**86**	**82**	**110**	**43**	**190**	**200**	**16**	**44**	**71**
C_9-C_{10} Aromatic Hydrocarbons	<10	<10	<10	<10	**61**	**160**	<10	<10	<10

Notes:
Samples collected by Geosphere Environmental Management
Samples submitted to Alpha Analytical of Mansfield, MA
Results presented in µg/m3
NA - Not Analyzed
E - estimated
BOLD = Detected above laboratory standards
gray shaded = detected above applicable standard
blue shaded = analytical detection limit above applicable standard
< = not detected above laboratory detection limit shown
EPA Target Risk Levels are from Regional Screening Level Resident Air Supporting Table, November 2011. Values preceding "(HI)" indicate compounds that are not considered to be carcinogenic and risk levels are based on noncarcinogenic risk. "N/A" indicates compounds with no risk information available from this source.
MassDEP Residential Threshold Values are from Interim Final Vapor Intrusion Guidance, MassDEP Policy WSC# 11-435, December 2011.

TABLE 1

Indoor Air Chemical Analysis Results
Cummings Center, Beverly, MA
September 2012 and February 2013

Sample ID	S-171-X	NEPD	NEPD		
Sample Location	Building 600 Interior, Suite 171-X	Roof Exterior of Building 250 (Northeast Parking Deck)	Roof Exterior of Building 250 (Northeast Parking Deck)	EPA Target Risk: Carcinogenic = 1E-06 or HI = 1.0	MassDEP Residential Threshold Values
Sample Type	Air	Air	Air		
Date Sampled	2/4/2013 to 2/5/2013	9/20/2012 to 9/21/2012	2/4/2013 to 2/5/2013		
Volatile Organic Compounds (µg/m3)					
1,1,1-trichloroethane	<0.109	<0.109	<0.109	5200 (HI)	3
1,1,1,2-tetrachloroethane	<0.137	<0.137	<0.137	0.33	
1,1,2,2-tetrachloroethane	<0.137	<0.137	<0.137	0.042	0.04
1,1,2-trichloroethane	<0.109	<0.109	<0.109	0.15	0.15
1,1-dichloroethane	<0.081	<0.081	<0.081	1.5	0.8
1,1-dichloroethene	<0.079	<0.079	<0.079	210 (HI)	0.8
1,2,4-trichlorobenzene	<0.371	<0.371	<0.371	2.1 (HI)	3.4
1,2,4-trimethylbenzene	**0.118**	**0.177**	<0.098	7.3 (HI)	
1,2-dibromoethane	<0.154	<0.154	<0.154	0.0041	
1,2-dichlorobenzene	<0.12	<0.12	<0.12	210 (HI)	0.72
1,2-dichloroethane	**0.097**	<0.081	<0.081	0.094	0.09
1,2-dichloropropane	<0.092	<0.092	<0.092	0.24	0.13
1,3,5-trimethylbenzene	<0.098	<0.098	<0.098	7.3 (HI)	
1,3-butadiene	<0.044	<0.044	<0.044	0.081	
1,3-dichlorobenzene	<0.12	<0.12	<0.12	200(HI)	0.6
1,4-dichlorobenzene	<0.12	<0.12	<0.12	0.22	0.5
1,4-dioxane	<0.721	NA	<0.721	0.32	0.59
2,2,4-trimethylpentane	<0.934	<0.934	<0.934	N/A	
2-butanone	**0.622**	**0.696**	**0.619**	5200(HI)	12
2-hexanone	<0.82	<0.82	<0.82	31(HI)	
3-chloropropene	<0.626	NA	<0.626	0.41	
4-Ethyltoluene	<0.983	<0.983	<0.983	N/A	
Acetone	**8.84**	**6.03**	**3.8**	32,000(HI)	91
Benzene	**0.486**	<0.319	**0.486**	0.31	2.3
Benzyl Chloride	<1.04	NA	<1.04	0.05	
Bromodichloromethane	<0.134	<0.134	<0.134	0.066	0.14
Bromoform	<0.207	<0.207	<0.207	2.2	2.2
Bromomethane	<0.078	<0.078	<0.078	5.2(HI)	
Carbon disulfide	<0.623	<0.623	<0.623	730 (HI)	
Carbon tetrachloride	**0.566**	**0.308**	**0.547**	0.41	0.54
Chlorobenzene	<0.092	<0.092	<0.092	52 (HI)	
Chloroethane	<0.053	<0.053	<0.053	10,000 (HI)	
Chloroform	**0.415**	**0.132**	<0.098	0.11	1.9
Chloromethane	<1.03	<1.03	<1.03	94 (HI)	
Cis-1,2-dichloroethene	<0.079	<0.079	<0.079	35 (HI)	0.8
Cis-1,3-dichloropropene	<0.091	<0.091	<0.091	0.61	0.6
Cyclohexane	<0.688	<0.688	<0.688	6300 (HI)	
Dibromochloromethane	<0.17	<0.17	<0.17	0.09	0.1
Dichlorodifluoromethane	**2.24**	**0.979**	**2.23**	100 (HI)	
Ethanol	**46.7**	<4.71	<4.71	N/A	
Ethyl acetate	<1.80	<1.80	<1.80	N/A	
Ethylbenzene	**0.113**	**0.165**	**0.087**	0.97	7.4
Freon-113	**0.598**	**0.529**	**0.483**	31,000 (HI)	
Freon-114	<0.349	<0.349	<0.349	N/A	
Hexachlorobutadiene	<0.533	<0.533	<0.533	0.11	4.6
Hexane	0.811	**2.3**	**2.35**	730 (HI)	
Isopropyl alcohol	**13.1**	<1.23	<1.23	7300 (HI)	
Methylene chloride	<4.86	**7.85**	<4.86	94 (HI)	5
MIBK	<0.82	<0.82	<0.82	3100 (HI)	2.2
MTBE	<0.072	<0.072	<0.072	9.4	39
M+p-xylene	**0.287**	**0.491**	**0.235**	100 (HI)	20
n-heptane	**0.857**	NA	<0.820	N/A	
Naphthalene	<0.262	NA	<0.262	0.072	0.61
o-xylene	**0.117**	**0.182**	**0.096**	100 (HI)	20
Propylene	<0.861	<0.86	<0.861	3100 (HI)	
Styrene	**0.123**	<0.085	<0.085	1000 (HI)	1.4
Tetrachloroethylene	<0.136	**0.278**	<0.136	0.41	1.4

TABLE 1

Indoor Air Chemical Analysis Results
Cummings Center, Beverly, MA
September 2012 and February 2013

Sample ID	S-171-X	NEPD	NEPD		
Sample Location	Building 600 Interior, Suite 171-X	Roof Exterior of Building 250 (Northeast Parking Deck)	Roof Exterior of Building 250 (Northeast Parking Deck)		
Sample Type	Air	Air	Air	EPA Target Risk: Carcinogenic = 1E-06 or HI = 1.0	MassDEP Residential Threshold Values
Date Sampled	2/4/2013 to 2/5/2013	9/20/2012 to 9/21/2012	2/4/2013 to 2/5/2013		
Volatile Organic Compounds (µg/m3)					
Tetrahydrofuran	<0.59	<0.59	<0.59	2000 (HI)	
Toluene	**0.618**	**1.07**	**0.531**	3200 (HI)	54
Trans-1,2-dichloroethene	<0.079	<0.079	<0.079	63 (HI)	0.8
Trans-1,3-dichloropropene	<0.091	<0.091	<0.091	0.61	0.6
Trichloroethene	<0.107	<0.107	<0.107	0.43	0.8
Trichlorofluoromethane	**1.31**	**1.09**	**1.21**	730 (HI)	
Vinyl acetate	<0.704	NA	<0.704	210 (HI)	
Vinyl bromide	<0.874	NA	<0.874	0.076	
Vinyl chloride	<0.051	<0.051	<0.051	0.16	0.27
Air-Phase Petroleum Hydrocarbon Target Analytes - APH (µg/m3)					
1,3-Butadiene	<2.0	<2.0	<2.0	0.081	
Methyl-tert-butyl ether	<2.0	<2.0	<2.0	9.4	39
Benzene	<2.0	<2.0	<2.0	0.31	2.3
Toluene	<2.0	<2.0	<2.0	3200 (HI)	54
Ethylbenzene	<2.0	<2.0	<2.0	0.97	7.4
m- & p- Xylenes	<4.0	<4.0	<4.0	100 (HI)	20
o-Xylenes	<2.0	<2.0	<2.0	100 (HI)	20
Naphthalene	<2.0	<2.0	<2.0	0.072	0.61
Air-Phase Petroleum Hydrocarbons - APH (µg/m3)					
C_5-C_8 Aliphatic Hydrocarbons	**18**	<12	<12	N/A	58
C_9-C_{12} Aliphatic Hydrocarbons	**25**	<14	<14	N/A	68
C_9-C_{10} Aromatic Hydrocarbons	<10	<10	<10	N/A	10

Notes:
Samples collected by Geosphere Environmental Management
Samples submitted to Alpha Analytical of Mansfield, MA
Results presented in µg/m3
NA - Not Analyzed
E - estimated
BOLD = Detected above laboratory standards
gray shaded = detected above applicable standard
blue shaded = analytical detection limit above applicable standard
< = not detected above laboratory detection limit shown
EPA Target Risk Levels are from Regional Screening Level Resident Air Supportin
2011. Values preceding "(HI)" indicate compounds that are not considered tc
levels are based on noncarcinogenic risk. "N/A" indicates compounds with nc
from this source.
MassDEP Residential Threshold Values are from Interim Final Vapor Intrusion G
Policy WSC# 11-435, December 2011.

TABLE 2

Indoor Air Carcinogenic Unit Risk Factors and Non-Cancer Reference Concentrations

	EPA Carcinogenic Unit Risk Factor (m3/µg)	EPA Reference Concentration (mg/m3)	MassDEP Carcinogenic Unit Risk Factor (m3/µg)	MassDEP Reference Concentration (mg/m3)
Volatile Organic Compounds (µg/m3)				
1,1,1-trichloroethane	N/A	5.2	N/A	5.2
1,1,1,2-tetrachloroethane	7.40E-06	N/A	7.40E-06	1.10E-01
1,1,2,2-tetrachloroethane	5.80E-05	N/A	5.80E-05	9.30E-02
1,1,2-trichloroethane	1.60E-05	2.00E-04	1.60E-05	7.40E-02
1,1-dichloroethane	1.60E-06	N/A	N/A	5.00E-01
1,1-dichloroethene	N/A	2.00E-01	N/A	2.00E-01
1,2,4-trichlorobenzene	N/A	2.00E-03	N/A	2.00E-01
1,2,4-trimethylbenzene	N/A	7.00E-03	N/A	N/A
1,2-dibromoethane	6.00E-04	9.00E-03	N/A	N/A
1,2-dichlorobenzene	N/A	2.00E-01	N/A	2.00E-01
1,2-dichloroethane	2.60E-05	7.00E-03	2.60E-05	5.50E-02
1,2-dichloropropane	1.00E-05	4.00E-03	1.90E-05	4.00E-03
1,3,5-trimethylbenzene	N/A	7.00E-03	N/A	N/A
1,3-butadiene	3.00E-05	2.00E-03	N/A	N/A
1,3-dichlorobenzene	N/A	2.00E-01	N/A	2.00E-01
1,4-dichlorobenzene	1.10E-05	8.00E-01	6.86E-06	8.00E-01
1,4-dioxane	7.70E-06	3.00E+00	4.10E-06	1.20E-01
2,2,4-trimethylpentane	N/A	N/A	N/A	N/A
2-butanone	N/A	5.00E+00	N/A	5.00E+00
2-hexanone	N/A	3.00E-02	N/A	N/A
3-chloropropene	6.00E-06	1.00E-03	N/A	N/A
4-Ethyltoluene	N/A	N/A	N/A	N/A
Acetone	N/A	3.10E+01	N/A	8.00E-01
Benzene	7.80E-06	3.00E-02	7.80E-06	3.00E-02
Benzyl Chloride	4.90E-05	1.00E-03	N/A	N/A
Bromodichloromethane	3.70E-05	N/A	1.77E-05	7.00E-02
Bromoform	1.10E-06	N/A	1.10E-06	7.00E-02
Bromomethane	N/A	5.00E-03	N/A	5.00E-03
Carbon disulfide	N/A	7.00E-01	N/A	N/A
Carbon tetrachloride	6.00E-06	1.00E-01	1.50E-05	4.30E-01
Chlorobenzene	N/A	5.00E-02	N/A	2.00E-02
Chloroethane	N/A	1.00E+01	N/A	N/A
Chloroform	2.30E-05	9.80E-02	2.30E-05	6.60E-01
Chloromethane	N/A	9.00E-02	N/A	N/A
Cis-1,2-dichloroethene	N/A	N/A	N/A	3.50E-02
Cis-1,3-dichloropropene	4.00E-06	2.00E-02	4.00E-06	2.00E-02
Cyclohexane	N/A	6.00E+00	N/A	N/A
Dibromochloromethane	2.70E-05	N/A	2.40E-05	7.00E-02
Dichlorodifluoromethane	N/A	1.00E-01	N/A	N/A
Ethanol	N/A	N/A	N/A	N/A
Ethyl acetate	N/A	N/A	N/A	N/A
Ethylbenzene	2.50E-06	1.00E+00	N/A	1.00E+00
Freon-113	N/A	3.00E+01	N/A	N/A
Freon-114	N/A	N/A	N/A	N/A
Hexachlorobutadiene	2.20E-05	N/A	2.20E-05	7.00E-04
Hexane	N/A	7.00E-01	N/A	N/A
Isopropyl alcohol	N/A	7.00E+00	N/A	N/A
Methylene chloride	4.70E-07	1.00E+00	4.70E-07	3.00E+00
MIBK	N/A	3.00E+00	N/A	3.00E+00
MTBE	2.60E-07	3.00E+00	N/A	3.00E+00
M+p-xylene	N/A	1.00E-01	N/A	1.00E-01
n-heptane	N/A	N/A	N/A	N/A
Naphthalene	3.40E-05	3.00E-03	N/A	3.00E-03
o-xylene	N/A	1.00E-01	N/A	1.00E-01
Propylene	N/A	3.00E+00	N/A	N/A
Styrene	N/A	1.00E+00	5.70E-07	1.00E+00
Tetrachloroethylene	5.90E-06	2.70E-01	1.00E-05	4.60E+00
Tetrahydrofuran	N/A	2.00E+00	N/A	N/A
Toluene	N/A	5.00E+00	N/A	5.00E+00
Trans-1,2-dichloroethene	N/A	6.00E-02	N/A	7.00E-02
Trans-1,3-dichloropropene	4.00E-06	2.00E-02	4.00E-06	2.00E-02
Trichloroethene	4.10E-06	2.00E-03	1.70E-06	1.80E-01
Trichlorofluoromethane	N/A	7.00E-01	N/A	N/A
Vinyl acetate	N/A	2.00E-01	N/A	N/A
Vinyl bromide	3.20E-05	3.00E-03	N/A	N/A
Vinyl chloride	4.40E-06	1.00E-01	8.80E-06	1.00E-01
Air-Phase Petroleum Hydrocarbon Target Analytes - APH (µg/m3)				
1,3-Butadiene	3.00E-05	2.00E-03	N/A	N/A
Methyl-tert-butyl ether	2.60E-07	3.00E+00	N/A	3.00E+00
Benzene	7.80E-06	3.00E-02	7.80E-06	3.00E-02
Toluene	N/A	5.00E+00	N/A	5.00E+00
Ethylbenzene	2.50E-06	1.00E+00	N/A	1.00E+00
m- & p- Xylenes	N/A	1.00E-01	N/A	1.00E-01
o-Xylenes	N/A	1.00E-01	N/A	1.00E-01
Naphthalene	3.40E-05	3.00E-03	N/A	3.00E-03
Air-Phase Petroleum Hydrocarbons - APH (µg/m3)				
C_5-C_8 Aliphatic Hydrocarbons	N/A	N/A	N/A	2.00E-01
C_9-C_{12} Aliphatic Hydrocarbons	N/A	N/A	N/A	2.00E-01
C_9-C_{10} Aromatic Hydrocarbons	N/A	N/A	N/A	5.00E-02

Notes:
EPA Carcinogenic Unit Risk Factors and Reference Concentrations are from Regional Screening Level Resident Air Supporting Table, November 2011.
MassDEP Carcinogenic Unit Risk Factors and Reference Concentrations are from MassDEP Method 3 Risk Characterization Shortforms Vlookup Spreadsheet Version 1012 updated October 2012.
N/A - No risk information available from this source

TABLE 3

Indoor Air Carcinogenic and Non-Cancer Risk Estimates
Building 100, Suite 149-J
Cummings Center, Beverly, MA

Sample ID	S-149-J	S-149-J	Carcinogenic Risk Based on EPA Factor: Maximum Detected Concentrations	Carcinogenic Risk Based on EPA Factor: Maximum Detected Concentrations Including Not Detected Compounds	Hazard Index Based on EPA Factor: Maximum Detected Concentrations	Hazard Index Based on EPA Factor: Maximum Detected Concentrations Including Not Detected Compounds	Carcinogenic Risk Based on MassDEP Factor: Maximum Detected Concentrations	Carcinogenic Risk Based on MassDEP Factor: Maximum Detected Concentrations Including Not Detected Compounds	Hazard Index Based on MassDEP Factor: Maximum Detected Concentrations	Hazard Index Based on MassDEP Factor: Maximum Detected Concentrations Including Not Detected Compounds
	Maximum Detected Concentration	Maximum Detected Concentration Including Compounds Not Detected								
Sample Location	Building 100 Interior, Suite 149-J	Building 100 Interior, Suite 149-J								
Sample Type	Air	Air								
Volatile Organic Compounds (µg/m3)										
1,1,1-trichloroethane	0.207	0.207	N/A	N/A	0.00	0.00	N/A	N/A	0.00	0.00
1,1,1,2-tetrachloroethane	ND	0.0685	NCC	7.44E-08	NCC	N/A	NCC	7.44E-08	NCC	0.00
1,1,2,2-tetrachloroethane	ND	0.0685	NCC	5.83E-07	NCC	N/A	NCC	5.83E-07	NCC	0.00
1,1,2-trichloroethane	ND	0.0545	NCC	1.28E-07	NCC	0.09	NCC	1.28E-07	NCC	0.00
1,1-dichloroethane	ND	0.0405	NCC	9.51E-09	NCC	N/A	NCC	N/A	NCC	0.00
1,1-dichloroethene	ND	0.0395	NCC	N/A	NCC	0.00	NCC	N/A	NCC	0.00
1,2,4-trichlorobenzene	ND	0.1855	NCC	N/A	NCC	0.03	NCC	N/A	NCC	0.00
1,2,4-trimethylbenzene	2.56	2.56	N/A	N/A	0.13	0.13	N/A	N/A	N/A	N/A
1,2-dibromoethane	ND	0.077	NCC	6.78E-06	NCC	0.00	NCC	N/A	NCC	N/A
1,2-dichlorobenzene	ND	0.06	NCC	N/A	NCC	0.00	NCC	N/A	NCC	0.00
1,2-dichloroethane	0.166	0.166	6.33E-07	6.33E-07	0.01	0.01	6.33E-07	6.33E-07	0.00	0.00
1,2-dichloropropane	ND	0.046	NCC	6.75E-08	NCC	0.00	NCC	1.28E-07	NCC	0.00
1,3,5-trimethylbenzene	0.801	0.801	N/A	N/A	0.04	0.04	N/A	N/A	N/A	N/A
1,3-butadiene	0.064	0.064	2.82E-07	2.82E-07	0.01	0.01	N/A	N/A	N/A	N/A
1,3-dichlorobenzene	ND	0.06	NCC	N/A	NCC	0.00	NCC	N/A	NCC	0.00
1,4-dichlorobenzene	ND	0.06	NCC	9.69E-08	NCC	0.00	NCC	6.04E-08	NCC	0.00
1,4-dioxane	ND	0.3605	NCC	4.07E-07	NCC	0.00	NCC	2.17E-07	NCC	0.00
2,2,4-trimethylpentane	ND	0.467	NCC	N/A	NCC	N/A	NCC	N/A	NCC	N/A
2-butanone	1.64	1.64	N/A	N/A	0.00	0.00	N/A	N/A	0.00	0.00
2-hexanone	ND	0.41	NCC	N/A	NCC	0.00	NCC	N/A	NCC	N/A
3-chloropropene	ND	0.313	NCC	2.76E-07	NCC	0.11	NCC	N/A	NCC	N/A
4-Ethyltoluene	ND	0.4915	NCC	N/A	NCC	N/A	NCC	N/A	NCC	N/A
Acetone	68.9	68.9	N/A	N/A	0.00	0.00	N/A	N/A	0.03	0.03
Benzene	0.585	0.585	6.70E-07	6.70E-07	0.01	0.01	6.70E-07	6.70E-07	0.01	0.01
Benzyl Chloride	ND	0.52	NCC	3.74E-06	NCC	0.18	NCC	N/A	NCC	N/A
Bromodichloromethane	0.147	0.147	7.98E-07	7.98E-07	N/A	N/A	3.82E-07	3.82E-07	0.00	0.00
Bromoform	ND	0.1035	NCC	1.67E-08	NCC	N/A	NCC	1.67E-08	NCC	0.00
Bromomethane	ND	0.039	NCC	N/A	NCC	0.00	NCC	N/A	NCC	0.00
Carbon disulfide	ND	0.3115	NCC	N/A	NCC	0.00	NCC	N/A	NCC	N/A
Carbon tetrachloride	0.591	0.591	5.20E-07	5.20E-07	0.00	0.00	1.30E-06	1.30E-06	0.00	0.00
Chlorobenzene	ND	0.046	NCC	N/A	NCC	0.00	NCC	N/A	NCC	0.00
Chloroethane	ND	0.0265	NCC	N/A	NCC	0.00	NCC	N/A	NCC	N/A
Chloroform	0.796	0.796	2.69E-06	2.69E-06	0.00	0.00	2.69E-06	2.69E-06	0.00	0.00
Chloromethane	1.03	1.03	N/A	N/A	0.00	0.00	N/A	N/A	N/A	N/A
Cis-1,2-dichloroethene	ND	0.039	NCC	N/A	NCC	N/A	NCC	N/A	NCC	0.00
Cis-1,3-dichloropropene	ND	0.0455	NCC	2.67E-08	NCC	0.00	NCC	2.67E-08	NCC	0.00
Cyclohexane	ND	0.344	NCC	N/A	NCC	0.00	NCC	N/A	NCC	N/A
Dibromochloromethane	ND	0.085	NCC	3.37E-07	NCC	N/A	NCC	2.99E-07	NCC	0.00
Dichlorodifluoromethane	2.35	2.35	N/A	N/A	0.01	0.01	N/A	N/A	N/A	N/A
Ethanol	266	266	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ethyl acetate	ND	0.9	NCC	N/A	NCC	N/A	NCC	N/A	NCC	N/A
Ethylbenzene	0.452	0.452	1.66E-07	1.66E-07	0.00	0.00	N/A	N/A	0.00	0.00
Freon-113	0.491	0.491	N/A	N/A	0.00	0.00	N/A	N/A	N/A	N/A
Freon-114	ND	0.1745	NCC	N/A	NCC	N/A	NCC	N/A	NCC	N/A
Hexachlorobutadiene	ND	0.2665	NCC	8.61E-07	NCC	N/A	NCC	8.61E-07	NCC	0.13
Hexane	1.88	1.88	N/A	N/A	0.00	0.00	N/A	N/A	N/A	N/A
Isopropyl alcohol	152	152	N/A	N/A	0.01	0.01	N/A	N/A	N/A	N/A
Methylene chloride	ND	2.43	NCC	1.68E-07	NCC	0.00	NCC	1.68E-07	NCC	0.00
MIBK	ND	0.41	NCC	N/A	NCC	0.00	NCC	N/A	NCC	0.00
MTBE	ND	0.036	NCC	1.37E-09	NCC	0.00	NCC	N/A	NCC	0.00
M+p-xylene	1.63	1.63	N/A	N/A	0.01	0.01	N/A	N/A	0.01	0.01
n-heptane	ND	0.41	NCC	N/A	NCC	N/A	NCC	N/A	NCC	N/A
Naphthalene	ND	0.131	NCC	6.54E-07	NCC	0.01	NCC	N/A	NCC	0.01
o-xylene	0.725	0.725	N/A	N/A	0.00	0.00	N/A	N/A	0.00	0.00
Propylene	ND	0.4305	NCC	N/A	NCC	0.00	NCC	N/A	NCC	N/A
Styrene	1.09	1.09	N/A	N/A	0.00	0.00	9.12E-08	9.12E-08	0.00	0.00
Tetrachloroethylene	0.468	0.468	4.05E-07	4.05E-07	0.00	0.00	6.87E-07	6.87E-07	0.00	0.00
Tetrahydrofuran	ND	0.295	NCC	N/A	NCC	0.00	NCC	N/A	NCC	N/A
Toluene	3.18	3.18	N/A	N/A	0.00	0.00	N/A	N/A	0.00	0.00
Trans-1,2-dichloroethene	ND	0.0395	NCC	N/A	NCC	0.00	NCC	N/A	NCC	0.00
Trans-1,3-dichloropropene	ND	0.0455	NCC	2.67E-08	NCC	0.00	NCC	2.67E-08	NCC	0.00
Trichloroethene	ND	0.0535	NCC	3.22E-08	NCC	0.01	NCC	1.33E-08	NCC	0.00
Trichlorofluoromethane	1.24	1.24	N/A	N/A	0.00	0.00	N/A	N/A	N/A	N/A
Vinyl acetate	ND	0.352	NCC	N/A	NCC	0.00	NCC	N/A	NCC	N/A
Vinyl bromide	ND	0.437	NCC	2.05E-06	NCC	0.05	NCC	N/A	NCC	N/A
Vinyl chloride	ND	0.0255	NCC	1.65E-08	NCC	0.00	NCC	3.29E-08	NCC	0.00
Air-Phase Petroleum Hydrocarbon Target Analytes - APH (µg/m3)										
1,3-Butadiene	ND	1.00	NCC	4.40E-06	NCC	0.17	NCC	N/A	NCC	N/A
Methyl-tert-butyl ether	ND	1.00	NCC	3.82E-08	NCC	0.00	NCC	N/A	NCC	0.00
Benzene	ND	1.00	NCC	1.14E-06	NCC	0.01	NCC	1.14E-06	NCC	0.01
Toluene	2.9	2.90	N/A	N/A	0.00	0.00	N/A	N/A	0.00	0.00
Ethylbenzene	ND	1.00	NCC	3.67E-07	NCC	0.00	NCC	N/A	NCC	0.00
m- & p- Xylenes	ND	2.00	NCC	N/A	NCC	0.01	NCC	N/A	NCC	0.01
o-Xylenes	ND	1.00	NCC	N/A	NCC	0.00	NCC	N/A	NCC	0.00
Naphthalene	ND	1.00	NCC	4.99E-06	NCC	0.11	NCC	N/A	NCC	0.11
Air-Phase Petroleum Hydrocarbons - APH (µg/m3)										
C_5-C_8 Aliphatic Hydrocarbons	110	110	N/A	N/A	N/A	N/A	N/A	N/A	0.19	0.19
C_9-C_{12} Aliphatic Hydrocarbons	110	110	N/A	N/A	N/A	N/A	N/A	N/A	0.19	0.19
C_9-C_{10} Aromatic Hydrocarbons	ND	5.00	NCC	N/A	NCC	N/A	NCC	N/A	NCC	0.03
TOTAL RISK			6.16E-06	2.25E-05	2.26E-01	7.29E-01	6.45E-06	9.09E-06	4.24E-01	6.17E-01

Notes:
Samples collected by Geosphere Environmental Management
Samples submitted to Alpha Analytical of Mansfield, MA
Results presented in µg/m3
ND - Not Detected
N/A - Not Applicable
NCC - Not a Contaminant of Concern
When including compounds not detected in risk calculations, 1/2 of the detection limit was used.

TABLE 4

Indoor Air Carcinogenic and Non-Cancer Risk Estimates
Building 100, Suite 157-J
Cummings Center, Beverly, MA

Sample ID	S-157-J	S-157-J	Carcinogenic Risk Based on EPA Factor: Maximum Detected Concentrations	Carcinogenic Risk Based on EPA Factor: Maximum Detected Concentrations Including Not Detected Compounds	Hazard Index Based on EPA Factor: Maximum Detected Concentrations	Hazard Index Based on EPA Factor: Maximum Detected Concentrations Including Not Detected Compounds	Carcinogenic Risk Based on MassDEP Factor: Maximum Detected Concentrations	Carcinogenic Risk Based on MassDEP Factor: Maximum Detected Concentrations Including Not Detected Compounds	Hazard Index Based on MassDEP Factor: Maximum Detected Concentrations	Hazard Index Based on MassDEP Factor: Maximum Detected Concentrations Including Not Detected Compounds
	Maximum Detected Concentration	Maximum Detected Concentration Including Compounds Not Detected								
Sample Location	Building 100 Interior, Suite 157-J	Building 100 Interior, Suite 157-J								
Sample Type	Air	Air								
Volatile Organic Compounds (µg/m3)										
1,1,1-trichloroethane	0.109	0.109	N/A	N/A	0.00	0.00	N/A	N/A	0.00	0.00
1,1,1,2-tetrachloroethane	ND	0.0685	NCC	7.44E-08	NCC	N/A	NCC	7.44E-08	NCC	0.00
1,1,2,2-tetrachloroethane	ND	0.0685	NCC	5.83E-07	NCC	N/A	NCC	5.83E-07	NCC	0.00
1,1,2-trichloroethane	ND	0.0545	NCC	1.28E-07	NCC	0.09	NCC	1.28E-07	NCC	0.00
1,1-dichloroethane	ND	0.0405	NCC	9.51E-09	NCC	N/A	NCC	N/A	NCC	0.00
1,1-dichloroethene	ND	0.0395	NCC	N/A	NCC	0.00	NCC	N/A	NCC	0.00
1,2,4-trichlorobenzene	ND	0.1855	NCC	N/A	NCC	0.03	NCC	N/A	NCC	0.00
1,2,4-trimethylbenzene	54.6	54.6	N/A	N/A	2.67	2.67	N/A	N/A	N/A	N/A
1,2-dibromoethane	ND	0.077	NCC	6.78E-06	NCC	0.00	NCC	N/A	NCC	N/A
1,2-dichlorobenzene	ND	0.06	NCC	N/A	NCC	0.00	NCC	N/A	NCC	0.00
1,2-dichloroethane	0.227	0.227	8.66E-07	8.66E-07	0.01	0.01	8.66E-07	8.66E-07	0.00	0.00
1,2-dichloropropane	ND	0.046	NCC	6.75E-08	NCC	0.00	NCC	1.28E-07	NCC	0.00
1,3,5-trimethylbenzene	13.5	13.5	N/A	N/A	0.66	0.66	N/A	N/A	N/A	N/A
1,3-butadiene	0.058	0.058	2.55E-07	2.55E-07	0.01	0.01	N/A	N/A	N/A	N/A
1,3-dichlorobenzene	ND	0.06	NCC	N/A	NCC	0.00	NCC	N/A	NCC	0.00
1,4-dichlorobenzene	ND	0.06	NCC	9.69E-08	NCC	0.00	NCC	6.04E-08	NCC	0.00
1,4-dioxane	ND	0.3605	NCC	4.07E-07	NCC	0.00	NCC	2.17E-07	NCC	0.00
2,2,4-trimethylpentane	ND	0.467	NCC	N/A	NCC	N/A	NCC	N/A	NCC	N/A
2-butanone	2.04	2.04	N/A	N/A	0.00	0.00	N/A	N/A	0.00	0.00
2-hexanone	ND	0.41	NCC	N/A	NCC	0.00	NCC	N/A	NCC	N/A
3-chloropropene	ND	0.313	NCC	2.76E-07	NCC	0.11	NCC	N/A	NCC	N/A
4-Ethyltoluene	12.4	12.4	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Acetone	70.8	70.8	N/A	N/A	0.00	0.00	N/A	N/A	0.03	0.03
Benzene	0.696	0.696	7.97E-07	7.97E-07	0.01	0.01	7.97E-07	7.97E-07	0.01	0.01
Benzyl Chloride	ND	0.52	NCC	3.74E-06	NCC	0.18	NCC	N/A	NCC	N/A
Bromodichloromethane	ND	0.067	NCC	3.64E-07	NCC	N/A	NCC	1.74E-07	NCC	0.00
Bromoform	ND	0.1035	NCC	1.67E-08	NCC	N/A	NCC	1.67E-08	NCC	0.00
Bromomethane	ND	0.039	NCC	N/A	NCC	0.00	NCC	N/A	NCC	0.00
Carbon disulfide	ND	0.3115	NCC	N/A	NCC	0.00	NCC	N/A	NCC	N/A
Carbon tetrachloride	0.572	0.572	5.04E-07	5.04E-07	0.00	0.00	1.26E-06	1.26E-06	0.00	0.00
Chlorobenzene	ND	0.046	NCC	N/A	NCC	0.00	NCC	N/A	NCC	0.00
Chloroethane	ND	0.0265	NCC	N/A	NCC	0.00	NCC	N/A	NCC	N/A
Chloroform	0.596	0.596	2.01E-06	2.01E-06	0.00	0.00	2.01E-06	2.01E-06	0.00	0.00
Chloromethane	ND	0.515	NCC	N/A	NCC	0.00	NCC	N/A	NCC	N/A
Cis-1,2-dichloroethene	0.131	0.131	N/A	N/A	N/A	N/A	N/A	N/A	0.00	0.00
Cis-1,3-dichloropropene	ND	0.0455	NCC	2.67E-08	NCC	0.00	NCC	2.67E-08	NCC	0.00
Cyclohexane	56.4	0.344	N/A	N/A	0.00	0.00	N/A	N/A	N/A	N/A
Dibromochloromethane	ND	0.085	NCC	3.37E-07	NCC	N/A	NCC	2.99E-07	NCC	0.00
Dichlorodifluoromethane	2.21	2.21	N/A	N/A	0.01	0.01	N/A	N/A	N/A	N/A
Ethanol	511	511	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ethyl acetate	ND	0.9	NCC	N/A	NCC	N/A	NCC	N/A	NCC	N/A
Ethylbenzene	0.964	0.964	3.54E-07	3.54E-07	0.00	0.00	N/A	N/A	0.00	0.00
Freon-113	0.498	0.498	N/A	N/A	0.00	0.00	N/A	N/A	N/A	N/A
Freon-114	ND	0.1745	NCC	N/A	NCC	N/A	NCC	N/A	NCC	N/A
Hexachlorobutadiene	ND	0.2665	NCC	8.61E-07	NCC	N/A	NCC	8.61E-07	NCC	0.13
Hexane	4.3	4.3	N/A	N/A	0.00	0.00	N/A	N/A	N/A	N/A
Isopropyl alcohol	396	396	N/A	N/A	0.02	0.02	N/A	N/A	N/A	N/A
Methylene chloride	10.5	2.43	7.24E-07	1.68E-07	0.00	0.00	7.24E-07	1.68E-07	0.00	0.00
MIBK	1.17	0.41	N/A	N/A	0.00	0.00	N/A	N/A	0.00	0.00
MTBE	ND	0.036	NCC	1.37E-09	NCC	0.00	NCC	N/A	NCC	0.00
M+p-xylene	3.21	3.21	N/A	N/A	0.01	0.01	N/A	N/A	0.01	0.01
n-heptane	ND	0.41	NCC	N/A	NCC	N/A	NCC	N/A	NCC	N/A
Naphthalene	0.367	0.367	1.83E-06	1.83E-06	0.04	0.04	N/A	N/A	0.04	0.04
o-xylene	2.34	2.34	N/A	N/A	0.01	0.01	N/A	N/A	0.01	0.01
Propylene	ND	0.43	NCC	N/A	NCC	0.00	NCC	N/A	NCC	N/A
Styrene	0.588	0.588	N/A	N/A	0.00	0.00	4.92E-08	4.92E-08	0.00	0.00
Tetrachloroethylene	0.312	0.312	2.70E-07	2.70E-07	0.00	0.00	4.58E-07	4.58E-07	0.00	0.00
Tetrahydrofuran	ND	0.295	NCC	N/A	NCC	0.00	NCC	N/A	NCC	N/A
Toluene	2.67	2.67	N/A	N/A	0.00	0.00	N/A	N/A	0.00	0.00
Trans-1,2-dichloroethene	ND	0.0395	NCC	N/A	NCC	0.00	NCC	N/A	NCC	0.00
Trans-1,3-dichloropropene	ND	0.0455	NCC	2.67E-08	NCC	0.00	NCC	2.67E-08	NCC	0.00
Trichloroethene	ND	0.0535	NCC	3.22E-08	NCC	0.01	NCC	1.33E-08	NCC	0.00
Trichlorofluoromethane	1.26	1.26	N/A	N/A	0.00	0.00	N/A	N/A	N/A	N/A
Vinyl acetate	ND	0.352	NCC	N/A	NCC	0.00	NCC	N/A	NCC	N/A
Vinyl bromide	ND	0.437	NCC	2.05E-06	NCC	0.05	NCC	N/A	NCC	N/A
Vinyl chloride	ND	0.0255	NCC	1.65E-08	NCC	0.00	NCC	3.29E-08	NCC	0.00
Air-Phase Petroleum Hydrocarbon Target Analytes - APH (µg/m3)										
1,3-Butadiene	ND	1.00	NCC	4.40E-06	NCC	0.17	NCC	N/A	NCC	N/A
Methyl-tert-butyl ether	ND	1.00	NCC	3.82E-08	NCC	0.00	NCC	N/A	NCC	0.00
Benzene	ND	1.00	NCC	1.14E-06	NCC	0.01	NCC	1.14E-06	NCC	0.01
Toluene	2.5	2.5	N/A	N/A	0.00	0.00	N/A	N/A	0.00	0.00
Ethylbenzene	ND	1.00	NCC	3.67E-07	NCC	0.00	NCC	N/A	NCC	0.00
m- & p- Xylenes	ND	2.00	NCC	N/A	NCC	0.01	NCC	N/A	NCC	0.01
o-Xylenes	2.3	2.3	N/A	N/A	0.01	0.01	N/A	N/A	0.01	0.01
Naphthalene	ND	1.00	NCC	4.99E-06	NCC	0.11	NCC	N/A	NCC	0.11
Air-Phase Petroleum Hydrocarbons - APH (µg/m3)										
C_5-C_8 Aliphatic Hydrocarbons	320	320	N/A	N/A	N/A	N/A	N/A	N/A	0.55	0.55
C_9-C_{12} Aliphatic Hydrocarbons	200	200	N/A	N/A	N/A	N/A	N/A	N/A	0.34	0.34
C_9-C_{10} Aromatic Hydrocarbons	160	160	N/A	N/A	N/A	N/A	N/A	N/A	1.10	1.10
TOTAL RISK			7.61E-06	2.30E-05	3.46E+00	3.95E+00	6.17E-06	8.25E-06	2.09E+00	2.23E+00

Notes:
Samples collected by Geosphere Environmental Management
Samples submitted to Alpha Analytical of Mansfield, MA
Results presented in µg/m3
ND - Not Detected
N/A - Not Applicable
NCC - Not a Contaminant of Concern
When including compounds not detected in risk calculations, 1/2 of the detection limit was used.

TABLE 5

Indoor Air Carcinogenic and Non-Cancer Risk Estimates
Building 500, Suite 1100
Cummings Center, Beverly, MA

Sample ID	S-1100	S-1100	Carcinogenic Risk Based on EPA Factor: Maximum Detected Concentrations	Carcinogenic Risk Based on EPA Factor: Maximum Detected Concentrations Including Not Detected Compounds	Hazard Index Based on EPA Factor: Maximum Detected Concentrations	Hazard Index Based on EPA Factor: Maximum Detected Concentrations Including Not Detected Compounds	Carcinogenic Risk Based on MassDEP Factor: Maximum Detected Concentrations	Carcinogenic Risk Based on MassDEP Factor: Maximum Detected Concentrations Including Not Detected Compounds	Hazard Index Based on MassDEP Factor: Maximum Detected Concentrations	Hazard Index Based on MassDEP Factor: Maximum Detected Concentrations Including Not Detected Compounds
	Maximum Detected Concentration	Maximum Detected Concentration Including Compounds Not Detected								
Sample Location	Building 500 Interior, Suite 1100	Building 500 Interior, Suite 1100								
Sample Type	Air	Air								
Volatile Organic Compounds (µg/m3)										
1,1,1-trichloroethane	ND	0.0545	NCC	N/A	NCC	0.00	NCC	N/A	NCC	0.00
1,1,1,2-tetrachloroethane	ND	0.0685	NCC	7.44E-08	NCC	N/A	NCC	7.44E-08	NCC	0.00
1,1,2,2-tetrachloroethane	ND	0.0685	NCC	5.83E-07	NCC	N/A	NCC	5.83E-07	NCC	0.00
1,1,2-trichloroethane	ND	0.0545	NCC	1.28E-07	NCC	0.09	NCC	1.28E-07	NCC	0.00
1,1-dichloroethane	ND	0.0405	NCC	9.51E-09	NCC	N/A	NCC	N/A	NCC	0.00
1,1-dichloroethene	ND	0.0395	NCC	N/A	NCC	0.00	NCC	N/A	NCC	0.00
1,2,4-trichlorobenzene	ND	0.1855	NCC	N/A	NCC	0.03	NCC	N/A	NCC	0.00
1,2,4-trimethylbenzene	0.329	0.329	N/A	N/A	0.02	0.02	N/A	N/A	N/A	N/A
1,2-dibromoethane	ND	0.077	NCC	6.78E-06	NCC	0.00	NCC	N/A	NCC	N/A
1,2-dichlorobenzene	ND	0.06	NCC	N/A	NCC	0.00	NCC	N/A	NCC	0.00
1,2-dichloroethane	0.154	0.154	5.88E-07	5.88E-07	0.01	0.01	5.88E-07	5.88E-07	0.00	0.00
1,2-dichloropropane	ND	0.046	NCC	6.75E-08	NCC	0.00	NCC	1.28E-07	NCC	0.00
1,3,5-trimethylbenzene	ND	0.049	NCC	N/A	NCC	0.00	NCC	N/A	NCC	N/A
1,3-butadiene	ND	0.022	NCC	9.69E-08	NCC	0.00	NCC	N/A	NCC	N/A
1,3-dichlorobenzene	ND	0.06	NCC	N/A	NCC	0.00	NCC	N/A	NCC	0.00
1,4-dichlorobenzene	ND	0.06	NCC	9.69E-08	NCC	0.00	NCC	6.04E-08	NCC	0.00
1,4-dioxane	ND	0.3605	NCC	4.07E-07	NCC	0.00	NCC	2.17E-07	NCC	0.00
2,2,4-trimethylpentane	ND	0.467	NCC	N/A	NCC	N/A	NCC	N/A	NCC	N/A
2-butanone	1.23	1.23	N/A	N/A	0.00	0.00	N/A	N/A	0.00	0.00
2-hexanone	ND	0.41	NCC	N/A	NCC	0.00	NCC	N/A	NCC	N/A
3-chloropropene	ND	0.313	NCC	2.76E-07	NCC	0.11	NCC	N/A	NCC	N/A
4-Ethyltoluene	ND	0.4915	NCC	N/A	NCC	N/A	NCC	N/A	NCC	N/A
Acetone	19.7	19.7	N/A	N/A	0.00	0.00	N/A	N/A	0.01	0.01
Benzene	0.486	0.486	5.56E-07	5.56E-07	0.01	0.01	5.56E-07	5.56E-07	0.01	0.01
Benzyl Chloride	ND	0.52	NCC	3.74E-06	NCC	0.18	NCC	N/A	NCC	N/A
Bromodichloromethane	ND	0.067	NCC	3.64E-07	NCC	N/A	NCC	1.74E-07	NCC	0.00
Bromoform	ND	0.1035	NCC	1.67E-08	NCC	N/A	NCC	1.67E-08	NCC	0.00
Bromomethane	ND	0.039	NCC	N/A	NCC	0.00	NCC	N/A	NCC	0.00
Carbon disulfide	ND	0.3115	NCC	N/A	NCC	0.00	NCC	N/A	NCC	N/A
Carbon tetrachloride	0.566	0.566	4.98E-07	4.98E-07	0.00	0.00	1.25E-06	1.25E-06	0.00	0.00
Chlorobenzene	ND	0.046	NCC	N/A	NCC	0.00	NCC	N/A	NCC	0.00
Chloroethane	ND	0.0265	NCC	N/A	NCC	0.00	NCC	N/A	NCC	N/A
Chloroform	0.425	0.425	1.43E-06	1.43E-06	0.00	0.00	1.43E-06	1.43E-06	0.00	0.00
Chloromethane	1.36	1.36	N/A	N/A	0.01	0.01	N/A	N/A	N/A	N/A
Cis-1,2-dichloroethene	ND	0.0395	NCC	N/A	NCC	N/A	NCC	N/A	NCC	0.00
Cis-1,3-dichloropropene	ND	0.0455	NCC	2.67E-08	NCC	0.00	NCC	2.67E-08	NCC	0.00
Cyclohexane	ND	0.344	NCC	N/A	NCC	0.00	NCC	N/A	NCC	N/A
Dibromochloromethane	ND	0.085	NCC	3.37E-07	NCC	N/A	NCC	2.99E-07	NCC	0.00
Dichlorodifluoromethane	2.88	2.88	N/A	N/A	0.01	0.01	N/A	N/A	N/A	N/A
Ethanol	384	384	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ethyl acetate	ND	0.9	NCC	N/A	NCC	N/A	NCC	N/A	NCC	N/A
Ethylbenzene	0.2	0.2	7.34E-08	7.34E-08	0.00	0.00	N/A	N/A	0.00	0.00
Freon-113	0.628	0.628	N/A	N/A	0.00	0.00	N/A	N/A	N/A	N/A
Freon-114	ND	0.1745	NCC	N/A	NCC	N/A	NCC	N/A	NCC	N/A
Hexachlorobutadiene	ND	0.2665	NCC	8.61E-07	NCC	N/A	NCC	8.61E-07	NCC	0.13
Hexane	1.12	0.3525	N/A	N/A	0.00	0.00	N/A	N/A	N/A	N/A
Isopropyl alcohol	79.4	79.4	N/A	N/A	0.00	0.00	N/A	N/A	N/A	N/A
Methylene chloride	6.91	2.43	4.77E-07	1.68E-07	0.00	0.00	4.77E-07	1.68E-07	0.00	0.00
MIBK	ND	0.41	NCC	N/A	NCC	0.00	NCC	N/A	NCC	0.00
MTBE	ND	0.036	NCC	1.37E-09	NCC	0.00	NCC	N/A	NCC	0.00
M+p-xylene	0.526	0.526	N/A	N/A	0.00	0.00	N/A	N/A	0.00	0.00
n-heptane	ND	0.41	NCC	N/A	NCC	N/A	NCC	N/A	NCC	N/A
Naphthalene	ND	0.131	NCC	6.54E-07	NCC	0.01	NCC	N/A	NCC	0.01
o-xylene	0.191	0.191	N/A	N/A	0.00	0.00	N/A	N/A	0.00	0.00
Propylene	ND	0.43	NCC	N/A	NCC	0.00	NCC	N/A	NCC	N/A
Styrene	0.132	0.132	N/A	N/A	0.00	0.00	1.10E-08	1.10E-08	0.00	0.00
Tetrachloroethylene	0.258	0.068	2.23E-07	5.89E-08	0.00	0.00	3.79E-07	9.98E-08	0.00	0.00
Tetrahydrofuran	0.669	0.295	N/A	N/A	0.00	0.00	N/A	N/A	N/A	N/A
Toluene	2.8	2.8	N/A	N/A	0.00	0.00	N/A	N/A	0.00	0.00
Trans-1,2-dichloroethene	ND	0.0395	NCC	N/A	NCC	0.00	NCC	N/A	NCC	0.00
Trans-1,3-dichloropropene	ND	0.0455	NCC	2.67E-08	NCC	0.00	NCC	2.67E-08	NCC	0.00
Trichloroethene	ND	0.0535	NCC	3.22E-08	NCC	0.01	NCC	1.33E-08	NCC	0.00
Trichlorofluoromethane	1.59	1.59	N/A	N/A	0.00	0.00	N/A	N/A	N/A	N/A
Vinyl acetate	ND	0.352	NCC	N/A	NCC	0.00	NCC	N/A	NCC	N/A
Vinyl bromide	ND	0.437	NCC	2.05E-06	NCC	0.05	NCC	N/A	NCC	N/A
Vinyl chloride	ND	0.0255	NCC	1.65E-08	NCC	0.00	NCC	3.29E-08	NCC	0.00
Air-Phase Petroleum Hydrocarbon Target Analytes - APH (µg/m3)										
1,3-Butadiene	ND	1.00	NCC	4.40E-06	NCC	0.17	NCC	N/A	NCC	N/A
Methyl-tert-butyl ether	ND	1.00	NCC	3.82E-08	NCC	0.00	NCC	N/A	NCC	0.00
Benzene	ND	1.00	NCC	1.14E-06	NCC	0.01	NCC	1.14E-06	NCC	0.01
Toluene	2.4	2.4	N/A	N/A	0.00	0.00	N/A	N/A	0.00	0.00
Ethylbenzene	ND	1.00	NCC	3.67E-07	NCC	0.00	NCC	N/A	NCC	0.00
m- & p- Xylenes	ND	2.00	NCC	N/A	NCC	0.01	NCC	N/A	NCC	0.01
o-Xylenes	ND	1.00	NCC	N/A	NCC	0.00	NCC	N/A	NCC	0.00
Naphthalene	ND	1.00	NCC	4.99E-06	NCC	0.11	NCC	N/A	NCC	0.11
Air-Phase Petroleum Hydrocarbons - APH (µg/m3)										
C_5-C_8 Aliphatic Hydrocarbons	39	39	N/A	N/A	N/A	N/A	N/A	N/A	0.07	0.07
C_9-C_{12} Aliphatic Hydrocarbons	44	44	N/A	N/A	N/A	N/A	N/A	N/A	0.08	0.08
C_9-C_{10} Aromatic Hydrocarbons	ND	5.00	NCC	N/A	NCC	N/A	NCC	N/A	NCC	0.03
TOTAL RISK			3.85E-06	2.00E-05	5.87E-02	5.65E-01	4.69E-06	6.74E-06	1.61E-01	3.54E-01

Notes:
Samples collected by Geosphere Environmental Management
Samples submitted to Alpha Analytical of Mansfield, MA
Results presented in µg/m3
ND - Not Detected
N/A - Not Applicable
NCC - Not a Contaminant of Concern
When including compounds not detected in risk calculations, 1/2 of the detection limit was used.

TABLE 6

Indoor Air Carcinogenic and Non-Cancer Risk Estimates
Building 600, Suite 171-X
Cummings Center, Beverly, MA

Sample ID	S-171-X	S-171-X	Carcinogenic Risk Based on EPA Factor: Maximum Detected Concentrations	Carcinogenic Risk Based on EPA Factor: Maximum Detected Concentrations Including Not Detected Compounds	Hazard Index Based on EPA Factor: Maximum Detected Concentrations	Hazard Index Based on EPA Factor: Maximum Detected Concentrations Including Not Detected Compounds	Carcinogenic Risk Based on MassDEP Factor: Maximum Detected Concentrations	Carcinogenic Risk Based on MassDEP Factor: Maximum Detected Concentrations Including Not Detected Compounds	Hazard Index Based on MassDEP Factor: Maximum Detected Concentrations	Hazard Index Based on MassDEP Factor: Maximum Detected Concentrations Including Not Detected Compounds
	Maximum Detected Concentration	Maximum Detected Concentration Including Compounds Not Detected								
Sample Location	Building 600 Interior, Suite 171-X	Building 600 Interior, Suite 171-X								
Sample Type	Air	Air								
Volatile Organic Compounds (µg/m3)										
1,1,1-trichloroethane	ND	0.0545	NCC	N/A	NCC	0.00	NCC	N/A	NCC	0.00
1,1,1,2-tetrachloroethane	ND	0.0685	NCC	7.44E-08	NCC	N/A	NCC	7.44E-08	NCC	0.00
1,1,2,2-tetrachloroethane	ND	0.0685	NCC	5.83E-07	NCC	N/A	NCC	5.83E-07	NCC	0.00
1,1,2-trichloroethane	ND	0.0545	NCC	1.28E-07	NCC	0.09	NCC	1.28E-07	NCC	0.00
1,1-dichloroethane	ND	0.0405	NCC	9.51E-09	NCC	N/A	NCC	N/A	NCC	0.00
1,1-dichloroethene	ND	0.0395	NCC	N/A	NCC	0.00	NCC	N/A	NCC	0.00
1,2,4-trichlorobenzene	ND	0.1855	NCC	N/A	NCC	0.03	NCC	N/A	NCC	0.00
1,2,4-trimethylbenzene	0.202	0.202	N/A	N/A	0.01	0.01	N/A	N/A	N/A	N/A
1,2-dibromoethane	ND	0.077	NCC	6.78E-06	NCC	0.00	NCC	N/A	NCC	N/A
1,2-dichlorobenzene	ND	0.06	NCC	N/A	NCC	0.00	NCC	N/A	NCC	0.00
1,2-dichloroethane	0.15	0.15	5.72E-07	5.72E-07	0.01	0.01	5.72E-07	5.72E-07	0.00	0.00
1,2-dichloropropane	ND	0.046	NCC	6.75E-08	NCC	0.00	NCC	1.28E-07	NCC	0.00
1,3,5-trimethylbenzene	ND	0.049	NCC	N/A	NCC	0.00	NCC	N/A	NCC	N/A
1,3-butadiene	ND	0.022	NCC	9.69E-08	NCC	0.00	NCC	N/A	NCC	N/A
1,3-dichlorobenzene	ND	0.06	NCC	N/A	NCC	0.00	NCC	N/A	NCC	0.00
1,4-dichlorobenzene	ND	0.06	NCC	9.69E-08	NCC	0.00	NCC	6.04E-08	NCC	0.00
1,4-dioxane	ND	0.3605	NCC	4.07E-07	NCC	0.00	NCC	2.17E-07	NCC	0.00
2,2,4-trimethylpentane	ND	0.467	NCC	N/A	NCC	N/A	NCC	N/A	NCC	N/A
2-butanone	1.51	1.51	N/A	N/A	0.00	0.00	N/A	N/A	0.00	0.00
2-hexanone	ND	0.41	NCC	N/A	NCC	0.00	NCC	N/A	NCC	N/A
3-chloropropene	ND	0.313	NCC	2.76E-07	NCC	0.11	NCC	N/A	NCC	N/A
4-Ethyltoluene	ND	0.4915	NCC	N/A	NCC	N/A	NCC	N/A	NCC	N/A
Acetone	33	33	N/A	N/A	0.00	0.00	N/A	N/A	0.01	0.01
Benzene	0.486	0.486	5.56E-07	5.56E-07	0.01	0.01	5.56E-07	5.56E-07	0.01	0.01
Benzyl Chloride	ND	0.52	NCC	3.74E-06	NCC	0.18	NCC	N/A	NCC	N/A
Bromodichloromethane	ND	0.067	NCC	3.64E-07	NCC	N/A	NCC	1.74E-07	NCC	0.00
Bromoform	ND	0.1035	NCC	1.67E-08	NCC	N/A	NCC	1.67E-08	NCC	0.00
Bromomethane	ND	0.039	NCC	N/A	NCC	0.00	NCC	N/A	NCC	0.00
Carbon disulfide	ND	0.3115	NCC	N/A	NCC	0.00	NCC	N/A	NCC	N/A
Carbon tetrachloride	0.566	0.566	4.98E-07	4.98E-07	0.00	0.00	1.25E-06	1.25E-06	0.00	0.00
Chlorobenzene	ND	0.046	NCC	N/A	NCC	0.00	NCC	N/A	NCC	0.00
Chloroethane	ND	0.0265	NCC	N/A	NCC	0.00	NCC	N/A	NCC	N/A
Chloroform	0.762	0.762	2.57E-06	2.57E-06	0.00	0.00	2.57E-06	2.57E-06	0.00	0.00
Chloromethane	1.36	1.36	N/A	N/A	0.01	0.01	N/A	N/A	N/A	N/A
Cis-1,2-dichloroethene	ND	0.0395	NCC	N/A	NCC	N/A	NCC	N/A	NCC	0.00
Cis-1,3-dichloropropene	ND	0.0455	NCC	2.67E-08	NCC	0.00	NCC	2.67E-08	NCC	0.00
Cyclohexane	ND	0.344	NCC	N/A	NCC	0.00	NCC	N/A	NCC	N/A
Dibromochloromethane	ND	0.085	NCC	3.37E-07	NCC	N/A	NCC	2.99E-07	NCC	0.00
Dichlorodifluoromethane	2.24	2.24	N/A	N/A	0.01	0.01	N/A	N/A	N/A	N/A
Ethanol	439	439	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ethyl acetate	ND	0.9	NCC	N/A	NCC	N/A	NCC	N/A	NCC	N/A
Ethylbenzene	0.217	0.217	7.96E-08	7.96E-08	0.00	0.00	N/A	N/A	0.00	0.00
Freon-113	0.598	0.598	N/A	N/A	0.00	0.00	N/A	N/A	N/A	N/A
Freon-114	ND	0.1745	NCC	N/A	NCC	N/A	NCC	N/A	NCC	N/A
Hexachlorobutadiene	ND	0.2665	NCC	8.61E-07	NCC	N/A	NCC	8.61E-07	NCC	0.13
Hexane	0.811	0.811	N/A	N/A	0.00	0.00	N/A	N/A	N/A	N/A
Isopropyl alcohol	92.9	92.9	N/A	N/A	0.00	0.00	N/A	N/A	N/A	N/A
Methylene chloride	ND	2.43	NCC	1.68E-07	NCC	0.00	NCC	1.68E-07	NCC	0.00
MIBK	ND	0.41	NCC	N/A	NCC	0.00	NCC	N/A	NCC	0.00
MTBE	ND	0.036	NCC	1.37E-09	NCC	0.00	NCC	N/A	NCC	0.00
M+p-xylene	0.53	0.53	N/A	N/A	0.00	0.00	N/A	N/A	0.00	0.00
n-heptane	0.857	0.857	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Naphthalene	ND	0.131	NCC	6.54E-07	NCC	0.01	NCC	N/A	NCC	0.01
o-xylene	0.23	0.23	N/A	N/A	0.00	0.00	N/A	N/A	0.00	0.00
Propylene	ND	0.43	NCC	N/A	NCC	0.00	NCC	N/A	NCC	N/A
Styrene	0.409	0.409	N/A	N/A	0.00	0.00	3.42E-08	3.42E-08	0.00	0.00
Tetrachloroethylene	0.21	0.068	1.82E-07	5.89E-08	0.00	0.00	3.08E-07	9.98E-08	0.00	0.00
Tetrahydrofuran	ND	0.295	NCC	N/A	NCC	0.00	NCC	N/A	NCC	N/A
Toluene	1.32	1.32	N/A	N/A	0.00	0.00	N/A	N/A	0.00	0.00
Trans-1,2-dichloroethene	ND	0.0395	NCC	N/A	NCC	0.00	NCC	N/A	NCC	0.00
Trans-1,3-dichloropropene	ND	0.0455	NCC	2.67E-08	NCC	0.00	NCC	2.67E-08	NCC	0.00
Trichloroethene	ND	0.0535	NCC	3.22E-08	NCC	0.01	NCC	1.33E-08	NCC	0.00
Trichlorofluoromethane	1.31	1.31	N/A	N/A	0.00	0.00	N/A	N/A	N/A	N/A
Vinyl acetate	ND	0.352	NCC	N/A	NCC	0.00	NCC	N/A	NCC	N/A
Vinyl bromide	ND	0.437	NCC	2.05E-06	NCC	0.05	NCC	N/A	NCC	N/A
Vinyl chloride	ND	0.0255	NCC	1.65E-08	NCC	0.00	NCC	3.29E-08	NCC	0.00
Air-Phase Petroleum Hydrocarbon Target Analytes - APH (µg/m3)										
1,3-Butadiene	ND	1.00	NCC	4.40E-06	NCC	0.17	NCC	N/A	NCC	N/A
Methyl-tert-butyl ether	ND	1.00	NCC	3.82E-08	NCC	0.00	NCC	N/A	NCC	0.00
Benzene	ND	1.00	NCC	1.14E-06	NCC	0.01	NCC	1.14E-06	NCC	0.01
Toluene	ND	1.00	NCC	N/A	NCC	0.00	NCC	N/A	NCC	0.00
Ethylbenzene	ND	1.00	NCC	3.67E-07	NCC	0.00	NCC	N/A	NCC	0.00
m- & p- Xylenes	ND	2.00	NCC	N/A	NCC	0.01	NCC	N/A	NCC	0.01
o-Xylenes	ND	1.00	NCC	N/A	NCC	0.00	NCC	N/A	NCC	0.00
Naphthalene	ND	1.00	NCC	4.99E-06	NCC	0.11	NCC	N/A	NCC	0.11
Air-Phase Petroleum Hydrocarbons - APH (µg/m3)										
C_5-C_8 Aliphatic Hydrocarbons	100	100	N/A	N/A	N/A	N/A	N/A	N/A	0.17	0.17
C_9-C_{12} Aliphatic Hydrocarbons	71	71	N/A	N/A	N/A	N/A	N/A	N/A	0.12	0.12
C_9-C_{10} Aromatic Hydrocarbons	ND	5.00	NCC	N/A	NCC	N/A	NCC	N/A	NCC	0.03
TOTAL RISK			4.46E-06	2.12E-05	4.94E-02	5.58E-01	5.29E-06	7.89E-06	3.17E-01	5.11E-01

Notes:
Samples collected by Geosphere Environmental Management
Samples submitted to Alpha Analytical of Mansfield, MA
Results presented in µg/m3
ND - Not Detected
N/A - Not Applicable
NCC - Not a Contaminant of Concern
When including compounds not detected in risk calculations, 1/2 of the detection limit was used.

TABLE 7

Indoor Air Carcinogenic and Non-Cancer Risk Estimates
Outdoor Background, Northeast Parking Deck
Cummings Center, Beverly, MA

Sample ID	NEPD	NEPD	Carcinogenic Risk Based on EPA Factor: Maximum Detected Concentrations	Carcinogenic Risk Based on EPA Factor: Maximum Detected Concentrations Including Not Detected Compounds	Hazard Index Based on EPA Factor: Maximum Detected Concentrations	Hazard Index Based on EPA Factor: Maximum Detected Concentrations Including Not Detected Compounds	Carcinogenic Risk Based on MassDEP Factor: Maximum Detected Concentrations	Carcinogenic Risk Based on MassDEP Factor: Maximum Detected Concentrations Including Not Detected Compounds	Hazard Index Based on MassDEP Factor: Maximum Detected Concentrations	Hazard Index Based on MassDEP Factor: Maximum Detected Concentrations Including Not Detected Compounds
	Maximum Detected Concentration	Maximum Detected Concentration Including Compounds Not Detected								
Sample Location	Roof Exterior of Building 250 (Northeast Parking Deck)	Roof Exterior of Building 250 (Northeast Parking Deck)								
Sample Type	Air	Air								
Volatile Organic Compounds (µg/m3)										
1,1,1-trichloroethane	ND	0.0545	NCC	N/A	NCC	0.00	NCC	N/A	NCC	0.00
1,1,1,2-tetrachloroethane	ND	0.0685	NCC	7.44E-08	NCC	N/A	NCC	7.44E-08	NCC	0.00
1,1,2,2-tetrachloroethane	ND	0.0685	NCC	5.83E-07	NCC	N/A	NCC	5.83E-07	NCC	0.00
1,1,2-trichloroethane	ND	0.0545	NCC	1.28E-07	NCC	0.09	NCC	1.28E-07	NCC	0.00
1,1-dichloroethane	ND	0.0405	NCC	9.51E-09	NCC	N/A	NCC	N/A	NCC	0.00
1,1-dichloroethene	ND	0.0395	NCC	N/A	NCC	0.00	NCC	N/A	NCC	0.00
1,2,4-trichlorobenzene	ND	0.1855	NCC	N/A	NCC	0.03	NCC	N/A	NCC	0.00
1,2,4-trimethylbenzene	0.177	0.177	N/A	N/A	0.01	0.01	N/A	N/A	N/A	N/A
1,2-dibromoethane	ND	0.077	NCC	6.78E-06	NCC	0.00	NCC	N/A	NCC	N/A
1,2-dichlorobenzene	ND	0.06	NCC	N/A	NCC	0.00	NCC	N/A	NCC	0.00
1,2-dichloroethane	ND	0.0405	NCC	1.55E-07	NCC	0.00	NCC	1.55E-07	NCC	0.00
1,2-dichloropropane	ND	0.046	NCC	6.75E-08	NCC	0.00	NCC	1.28E-07	NCC	0.00
1,3,5-trimethylbenzene	ND	0.049	NCC	N/A	NCC	0.00	NCC	N/A	NCC	N/A
1,3-butadiene	ND	0.022	NCC	9.69E-08	NCC	0.00	NCC	N/A	NCC	N/A
1,3-dichlorobenzene	ND	0.06	NCC	N/A	NCC	0.00	NCC	N/A	NCC	0.00
1,4-dichlorobenzene	ND	0.06	NCC	9.69E-08	NCC	0.00	NCC	6.04E-08	NCC	0.00
1,4-dioxane	ND	0.3605	NCC	4.07E-07	NCC	0.00	NCC	2.17E-07	NCC	0.00
2,2,4-trimethylpentane	ND	0.467	NCC	N/A	NCC	N/A	NCC	N/A	NCC	N/A
2-butanone	0.696	0.696	N/A	N/A	0.00	0.00	N/A	N/A	0.00	0.00
2-hexanone	ND	0.41	NCC	N/A	NCC	0.00	NCC	N/A	NCC	N/A
3-chloropropene	ND	0.313	NCC	2.76E-07	NCC	0.11	NCC	N/A	NCC	N/A
4-Ethyltoluene	ND	0.4915	NCC	N/A	NCC	N/A	NCC	N/A	NCC	N/A
Acetone	6.03	6.03	N/A	N/A	0.00	0.00	N/A	N/A	0.00	0.00
Benzene	0.486	0.486	5.56E-07	5.56E-07	0.01	0.01	5.56E-07	5.56E-07	0.01	0.01
Benzyl Chloride	ND	0.52	NCC	3.74E-06	NCC	0.18	NCC	N/A	NCC	N/A
Bromodichloromethane	ND	0.067	NCC	3.64E-07	NCC	N/A	NCC	1.74E-07	NCC	0.00
Bromoform	ND	0.1035	NCC	1.67E-08	NCC	N/A	NCC	1.67E-08	NCC	0.00
Bromomethane	ND	0.039	NCC	N/A	NCC	0.00	NCC	N/A	NCC	0.00
Carbon disulfide	ND	0.3115	NCC	N/A	NCC	0.00	NCC	N/A	NCC	N/A
Carbon tetrachloride	0.547	0.547	4.82E-07	4.82E-07	0.00	0.00	1.20E-06	1.20E-06	0.00	0.00
Chlorobenzene	ND	0.046	NCC	N/A	NCC	0.00	NCC	N/A	NCC	0.00
Chloroethane	ND	0.0265	NCC	N/A	NCC	0.00	NCC	N/A	NCC	N/A
Chloroform	0.132	0.132	4.46E-07	4.46E-07	0.00	0.00	4.46E-07	4.46E-07	0.00	0.00
Chloromethane	ND	0.515	NCC	N/A	NCC	0.00	NCC	N/A	NCC	N/A
Cis-1,2-dichloroethene	ND	0.0395	NCC	N/A	NCC	N/A	NCC	N/A	NCC	0.00
Cis-1,3-dichloropropene	ND	0.0455	NCC	2.67E-08	NCC	0.00	NCC	2.67E-08	NCC	0.00
Cyclohexane	ND	0.344	NCC	N/A	NCC	0.00	NCC	N/A	NCC	N/A
Dibromochloromethane	ND	0.085	NCC	3.37E-07	NCC	N/A	NCC	2.99E-07	NCC	0.00
Dichlorodifluoromethane	2.23	2.23	N/A	N/A	0.01	0.01	N/A	N/A	N/A	N/A
Ethanol	ND	2.355	NCC	N/A	NCC	N/A	NCC	N/A	NCC	N/A
Ethyl acetate	ND	0.9	NCC	N/A	NCC	N/A	NCC	N/A	NCC	N/A
Ethylbenzene	0.165	0.165	6.05E-08	6.05E-08	0.00	0.00	N/A	N/A	0.00	0.00
Freon-113	0.529	0.529	N/A	N/A	0.00	0.00	N/A	N/A	N/A	N/A
Freon-114	ND	0.1745	NCC	N/A	NCC	N/A	NCC	N/A	NCC	N/A
Hexachlorobutadiene	ND	0.2665	NCC	8.61E-07	NCC	N/A	NCC	8.61E-07	NCC	0.13
Hexane	2.35	2.35	N/A	N/A	0.00	0.00	N/A	N/A	N/A	N/A
Isopropyl alcohol	ND	0.615	NCC	N/A	NCC	0.00	NCC	N/A	NCC	N/A
Methylene chloride	7.85	7.85	5.42E-07	5.42E-07	0.00	0.00	5.42E-07	5.42E-07	0.00	0.00
MIBK	ND	0.41	NCC	N/A	NCC	0.00	NCC	N/A	NCC	0.00
MTBE	ND	0.036	NCC	1.37E-09	NCC	0.00	NCC	N/A	NCC	0.00
M+p-xylene	0.491	0.491	N/A	N/A	0.00	0.00	N/A	N/A	0.00	0.00
n-heptane	ND	0.41	NCC	N/A	NCC	N/A	NCC	N/A	NCC	N/A
Naphthalene	ND	0.131	NCC	6.54E-07	NCC	0.01	NCC	N/A	NCC	0.01
o-xylene	0.182	0.182	N/A	N/A	0.00	0.00	N/A	N/A	0.00	0.00
Propylene	ND	0.4305	NCC	N/A	NCC	0.00	NCC	N/A	NCC	N/A
Styrene	ND	0.0425	NCC	N/A	NCC	0.00	NCC	3.56E-09	NCC	0.00
Tetrachloroethylene	0.278	0.278	2.41E-07	2.41E-07	0.00	0.00	4.08E-07	4.08E-07	0.00	0.00
Tetrahydrofuran	ND	0.295	NCC	N/A	NCC	0.00	NCC	N/A	NCC	N/A
Toluene	1.07	1.07	N/A	N/A	0.00	0.00	N/A	N/A	0.00	0.00
Trans-1,2-dichloroethene	ND	0.0395	NCC	N/A	NCC	0.00	NCC	N/A	NCC	0.00
Trans-1,3-dichloropropene	ND	0.0455	NCC	2.67E-08	NCC	0.00	NCC	2.67E-08	NCC	0.00
Trichloroethene	ND	0.0535	NCC	3.22E-08	NCC	0.01	NCC	1.33E-08	NCC	0.00
Trichlorofluoromethane	1.21	1.21	N/A	N/A	0.00	0.00	N/A	N/A	N/A	N/A
Vinyl acetate	ND	0.352	NCC	N/A	NCC	0.00	NCC	N/A	NCC	N/A
Vinyl bromide	ND	0.437	NCC	2.05E-06	NCC	0.05	NCC	N/A	NCC	N/A
Vinyl chloride	ND	0.0255	NCC	1.65E-08	NCC	0.00	NCC	3.29E-08	NCC	0.00
Air-Phase Petroleum Hydrocarbon Target Analytes - APH (µg/m3)										
1,3-Butadiene	ND	1.00	NCC	4.40E-06	NCC	0.17	NCC	N/A	NCC	N/A
Methyl-tert-butyl ether	ND	1.00	NCC	3.82E-08	NCC	0.00	NCC	N/A	NCC	0.00
Benzene	ND	1.00	NCC	1.14E-06	NCC	0.01	NCC	1.14E-06	NCC	0.01
Toluene	ND	1.00	NCC	N/A	NCC	0.00	NCC	N/A	NCC	0.00
Ethylbenzene	ND	1.00	NCC	3.67E-07	NCC	0.00	NCC	N/A	NCC	0.00
m- & p- Xylenes	ND	2.00	NCC	N/A	NCC	0.01	NCC	N/A	NCC	0.01
o-Xylenes	ND	1.00	NCC	N/A	NCC	0.00	NCC	N/A	NCC	0.00
Naphthalene	ND	1.00	NCC	4.99E-06	NCC	0.11	NCC	N/A	NCC	0.11
Air-Phase Petroleum Hydrocarbons - APH (µg/m3)										
C_5-C_8 Aliphatic Hydrocarbons	ND	6.00	NCC	N/A	NCC	N/A	NCC	N/A	NCC	0.01
C_9-C_{12} Aliphatic Hydrocarbons	ND	7.00	NCC	N/A	NCC	N/A	NCC	N/A	NCC	0.01
C_9-C_{10} Aromatic Hydrocarbons	ND	5.00	NCC	N/A	NCC	N/A	NCC	N/A	NCC	0.03
TOTAL RISK			2.33E-06	1.91E-05	3.15E-02	5.44E-01	3.16E-06	5.96E-06	1.20E-02	2.28E-01

Notes:
Samples collected by Geosphere Environmental Management
Samples submitted to Alpha Analytical of Mansfield, MA
Results presented in µg/m3
ND - Not Detected
N/A - Not Applicable
NCC - Not a Contaminant of Concern
When including compounds not detected in risk calculations, 1/2 of the detection limit was used.

Table 8
Summary of Total Hazard Indices and Risk Estimates
Cummings Center
Beverly, Massachusetts

Receptor	Exposure Media/Route	Location	Noncarcinogenic Hazard Index				Excess Lifetime Cancer Risk Estimate			
			EPA	EPA With ND Compounds	MassDEP	MassDEP With ND Compounds	EPA	EPA With ND Compounds	MassDEP	MassDEP With ND Compounds
On-site Child/Day Care Worker	Inhalation of Indoor Air	Building 100, S-149-J	2.26E-01	7.29E-01	4.24E-01	6.17E-01	6.16E-06	**2.25E-05**	6.45E-06	9.09E-06
		Building 100, S-157-J	**3.46E+00**	**3.95E+00**	**2.09E+00**	**2.23E+00**	7.16E-06	**2.30E-05**	6.17E-06	8.25E-06
		Building 500, S-1100	5.87E-02	5.65E-01	1.61E-01	3.54E-01	3.85E-06	**2.00E-05**	4.69E-06	6.74E-06
		Building 600, S-171-X	4.94E-02	5.58E-01	3.17E-01	5.11E-01	4.40E-06	**2.12E-05**	5.29E-06	7.89E-06
		Background, Northeast Parking Deck	3.15E-02	5.44E-01	1.20E-02	2.28E-01	2.33E-06	**1.91E-05**	3.16E-06	5.96E-06
		Risk Limits:	**1.0**	**1.0**	**1.0**	**1.0**	**1.0E-05**	**1.0E-05**	**1.0E-05**	**1.0E-05**
		Any Scenarios Exceeding Acceptable Limits? (Shown in Bold and Underline)	**YES**	**YES**	**YES**	**YES**	**NO**	**YES**	**NO**	**NO**
		Location of Limit Exceedance	**Building 100, S-157-J**	**Building 100, S-157-J**	**Building 100, S-157-J**	**Building 100, S-157-J**		**All Locations**		
	Inhalation of Indoor Air Not Including Risk from Background	Building 100, S-149-J	1.95E-01	1.85E-01	4.12E-01	3.89E-01	3.83E-06	3.40E-06	3.29E-06	3.13E-06
		Building 100, S-157-J	**3.43E+00**	**3.41E+00**	**2.08E+00**	**2.00E+00**	4.83E-06	3.90E-06	3.01E-06	2.29E-06
		Building 500, S-1100	2.72E-02	2.10E-02	1.49E-01	1.26E-01	1.52E-06	9.00E-07	1.53E-06	7.80E-07
		Building 600, S-171-X	1.79E-02	1.40E-02	3.05E-01	2.83E-01	2.07E-06	2.10E-06	2.13E-06	1.93E-06
		Risk Limits:	**1.0**	**1.0**	**1.0**	**1.0**	**1.0E-05**	**1.0E-05**	**1.0E-05**	**1.0E-05**
		Any Scenarios Exceeding Acceptable Limits? (Shown in Bold and Underline)	**YES**	**YES**	**YES**	**YES**	**NO**	**NO**	**NO**	**NO**
		Location of Limit Exceedance	**Building 100, S-157-J**	**Building 100, S-157-J**	**Building 100, S-157-J**	**Building 100, S-157-J**				

Appendix A

Laboratory Analysis Reports

ANALYTICAL REPORT

Lab Number:	L1217119
Client:	Geosphere Environmental Mgmt, Inc 51 Portsmouth Avenue Exeter, NH 03833
ATTN:	Bruce Hoskins
Phone:	(603) 773-0075
Project Name:	CUMMINGS BEVERLY AIR SAMPLING
Project Number:	12201
Report Date:	10/31/12

Certifications & Approvals: NY (11627), CT (PH-0141), NH (2206), NJ NELAP (MA015), RI (LAO00299), PA (68-02089), LA NELAP (03090), FL (E87814), TX (T104704419), WA (C954), DOD (L2217.01), USDA (Permit #P330-11-00109), US Army Corps of Engineers.

320 Forbes Boulevard, Mansfield, MA 02048-1806
508-822-9300 (Fax) 508-822-3288 800-624-9220 - www.alphalab.com

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201

Lab Number: L1217119
Report Date: 10/31/12

Alpha Sample ID	Client ID	Sample Location	Collection Date/Time
L1217119-01	S-149-J	BEVERLY, MA	09/22/12 16:25
L1217119-02	DUP	BEVERLY, MA	09/22/12 16:30
L1217119-03	S-157-J	BEVERLY, MA	09/22/12 16:44
L1217119-04	S-1100	BEVERLY, MA	09/22/12 17:00
L1217119-05	S-171-X	BEVERLY, MA	09/22/12 17:07
L1217119-06	NEPD	BEVERLY, MA	09/22/12 17:18

Project Name: CUMMINGS BEVERLY AIR SAMPLING **Lab Number:** L1217119

Project Number: 12201 **Report Date:** 10/31/12

MADEP MCP Response Action Analytical Report Certification

This form provides certifications for all samples performed by MCP methods. Please refer to the Sample Results and Container Information sections of this report for specification of MCP methods used for each analysis. The following questions pertain only to MCP Analytical Methods.

An affirmative response to questions A through F is required for "Presumptive Certainty" status		
A	Were all samples received in a condition consistent with those described on the Chain-of-Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding times?	YES
B	Were the analytical method(s) and all associated QC requirements specified in the selected CAM protocol(s) followed?	YES
C	Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances?	YES
D	Does the laboratory report comply with all the reporting requirements specified in CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data?"	YES
E a.	VPH, EPH, and APH Methods only: Was each method conducted without significant modification(s)? (Refer to the individual method(s) for a list of significant modifications).	YES
E b.	APH and TO-15 Methods only: Was the complete analyte list reported for each method?	YES
F	Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all "No" responses to Questions A through E)?	YES

A response to questions G, H and I is required for "Presumptive Certainty" status		
G	Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocol(s)?	NO
H	Were all QC performance standards specified in the CAM protocol(s) achieved?	YES
I	Were results reported for the complete analyte list specified in the selected CAM protocol(s)?	YES

For any questions answered "No", please refer to the case narrative section on the following page(s).

Please note that sample matrix information is located in the Sample Results section of this report.

Project Name:	CUMMINGS BEVERLY AIR SAMPLING	**Lab Number:**	L1217119
Project Number:	12201	**Report Date:**	10/31/12

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet all of the requirements of NELAC, for all NELAC accredited parameters. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. Performance criteria for CAM and RCP methods allow for some LCS compound failures to occur and still be within method compliance. In these instances, the specific failures are not narrated but are noted in the associated QC table. This information is also incorporated in the Data Usability format for our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

HOLD POLICY
For samples submitted on hold, Alpha's policy is to hold samples free of charge for 30 days from the date the project is completed. After 30 days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples.

Please contact Client Services at 800-624-9220 with any questions.

Project Name:	CUMMINGS BEVERLY AIR SAMPLING	**Lab Number:**	L1217119
Project Number:	12201	**Report Date:**	10/31/12

Case Narrative (continued)

Report Submission

This report replaces the report issued on October 2, 2012. The list of compounds reported for TO-15 SIM has been amended per client request. The report also includes TO-15 analysis for a select list of compounds. The narrative section has also been amended.

MCP Related Narratives

Canisters were released from the laboratory on September 17, 2012.

The canister certification data is provided as an addendum.

L1217119-04 The RPD of the pre- and post-flow controller calibration check (21% RPD) was outside acceptable limits (< or = 20% RPD).

MCP Volatile Organics in Air

In reference to questions E b/I:

All samples were analyzed for a subset of the MCP compounds per client request.

In reference to question G:

One or more of the target analytes did not achieve the requested CAM reporting limits.

L1217119-03 was re-analyzed on dilution in order to quantitate the sample within the calibration range. The result should be considered estimated, and is qualified with an E flag, for any compound that exceeded the calibration on the initial analysis. The re-analysis was performed only for the compound that exceeded the calibration range.

MCP Volatile Organics in Air (SIM)

In reference to question G:

One or more of the target analytes did not achieve the requested CAM reporting limits.

Petroleum Hydrocarbons in Air

Project Name:	CUMMINGS BEVERLY AIR SAMPLING	**Lab Number:**	L1217119
Project Number:	12201	**Report Date:**	10/31/12

Case Narrative (continued)

In reference to question G:

One or more of the target analytes did not achieve the requested CAM reporting limits.

L1217119: All significant concentrations of non-petroleum VOCs detected in the TO-15 analysis were subtracted from the corresponding hydrocarbon ranges.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Kathleen O'Brien

Title: Technical Director/Representative Date: 10/31/12

AIR

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1217119
Report Date: 10/31/12

SAMPLE RESULTS

Lab ID: L1217119-01
Client ID: S-149-J
Sample Location: BEVERLY, MA
Matrix: Air
Anaytical Method: 101,TO-15
Analytical Date: 10/16/12 18:54
Analyst: MB

Date Collected: 09/22/12 16:25
Date Received: 09/24/12
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
MCP Volatile Organics in Air - Mansfield Lab								
Propylene	ND	0.500	--	ND	0.860	--		1
Ethyl Alcohol	121	2.50	--	228	4.71	--		1
Acetone	29.0	1.00	--	68.9	2.38	--		1
iso-Propyl Alcohol	61.8	0.500	--	152	1.23	--		1
Carbon disulfide	ND	0.200	--	ND	0.623	--		1
2-Butanone	0.555	0.200	--	1.64	0.590	--		1
Ethyl Acetate	ND	0.500	--	ND	1.80	--		1
Tetrahydrofuran	ND	0.200	--	ND	0.590	--		1
n-Hexane	0.303	0.200	--	1.07	0.705	--		1
Cyclohexane	ND	0.200	--	ND	0.688	--		1
2,2,4-Trimethylpentane	ND	0.200	--	ND	0.934	--		1
4-Methyl-2-pentanone	ND	0.200	--	ND	0.820	--		1
2-Hexanone	ND	0.200	--	ND	0.820	--		1
4-Ethyltoluene	ND	0.200	--	ND	0.983	--		1

Internal Standard	**% Recovery**	**Qualifier**	**Acceptance Criteria**
1,4-Difluorobenzene	85		60-140
Bromochloromethane	91		60-140
chlorobenzene-d5	80		60-140

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1217119
Report Date: 10/31/12

SAMPLE RESULTS

Lab ID: L1217119-01
Client ID: S-149-J
Sample Location: BEVERLY, MA
Matrix: Air
Anaytical Method: 101,TO15-SIM
Analytical Date: 09/27/12 21:11
Analyst: RY

Date Collected: 09/22/12 16:25
Date Received: 09/24/12
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
MCP Volatile Organics in Air by SIM - Mansfield Lab								
1,1,1-Trichloroethane	0.021	0.020	--	0.114	0.109	--		1
1,1,1,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
1,1,2,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
1,1,2-Trichloroethane	ND	0.020	--	ND	0.109	--		1
1,1-Dichloroethane	ND	0.020	--	ND	0.081	--		1
1,1-Dichloroethene	ND	0.020	--	ND	0.079	--		1
1,2,4-Trichlorobenzene	ND	0.050	--	ND	0.371	--		1
1,2,4-Trimethylbenzene	0.518	0.020	--	2.55	0.098	--		1
1,2-Dibromoethane	ND	0.020	--	ND	0.154	--		1
1,2-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,2-Dichloroethane	0.041	0.020	--	0.166	0.081	--		1
1,2-Dichloropropane	ND	0.020	--	ND	0.092	--		1
1,3,5-Trimethybenzene	0.161	0.020	--	0.792	0.098	--		1
1,3-Butadiene	0.025	0.020	--	0.055	0.044	--		1
1,3-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,4-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
Benzene	0.124	0.100	--	0.396	0.319	--		1
Bromodichloromethane	0.021	0.020	--	0.141	0.134	--		1
Bromoform	ND	0.020	--	ND	0.207	--		1
Bromomethane	ND	0.020	--	ND	0.078	--		1
Carbon tetrachloride	0.051	0.020	--	0.321	0.126	--		1
Chlorobenzene	ND	0.020	--	ND	0.092	--		1
Chloroethane	ND	0.020	--	ND	0.053	--		1
Chloroform	0.163	0.020	--	0.796	0.098	--		1

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1217119
Report Date: 10/31/12

SAMPLE RESULTS

Lab ID: L1217119-01
Client ID: S-149-J
Sample Location: BEVERLY, MA
Date Collected: 09/22/12 16:25
Date Received: 09/24/12
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	Results	RL	MDL	Results	RL	MDL	Qualifier	Dilution Factor
MCP Volatile Organics in Air by SIM - Mansfield Lab								
Chloromethane	ND	0.500	--	ND	1.03	--		1
cis-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
cis-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
Dibromochloromethane	ND	0.020	--	ND	0.170	--		1
Dichlorodifluoromethane	0.171	0.050	--	0.846	0.247	--		1
Ethylbenzene	0.104	0.020	--	0.452	0.087	--		1
Freon-113	0.062	0.050	--	0.475	0.383	--		1
Freon-114	ND	0.050	--	ND	0.349	--		1
Hexachlorobutadiene	ND	0.050	--	ND	0.533	--		1
Methylene chloride	ND	1.40	--	ND	4.86	--		1
Methyl tert butyl ether	ND	0.020	--	ND	0.072	--		1
p/m-Xylene	0.375	0.040	--	1.63	0.174	--		1
o-Xylene	0.167	0.020	--	0.725	0.087	--		1
Styrene	0.250	0.020	--	1.06	0.085	--		1
Tetrachloroethene	0.069	0.020	--	0.468	0.136	--		1
Toluene	0.843	0.050	--	3.18	0.188	--		1
trans-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
trans-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
Trichloroethene	ND	0.020	--	ND	0.107	--		1
Trichlorofluoromethane	0.182	0.050	--	1.02	0.281	--		1
Vinyl chloride	ND	0.020	--	ND	0.051	--		1

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-difluorobenzene	104		60-140
bromochloromethane	101		60-140
chlorobenzene-d5	109		60-140

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1217119
Report Date: 10/31/12

SAMPLE RESULTS

Lab ID: L1217119-02
Client ID: DUP
Sample Location: BEVERLY, MA
Matrix: Air
Anaytical Method: 101,TO-15
Analytical Date: 10/16/12 19:25
Analyst: MB

Date Collected: 09/22/12 16:30
Date Received: 09/24/12
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
MCP Volatile Organics in Air - Mansfield Lab								
Propylene	ND	0.500	--	ND	0.860	--		1
Ethyl Alcohol	99.3	2.50	--	187	4.71	--		1
Acetone	23.5	1.00	--	55.8	2.38	--		1
iso-Propyl Alcohol	48.0	0.500	--	118	1.23	--		1
Carbon disulfide	ND	0.200	--	ND	0.623	--		1
2-Butanone	0.515	0.200	--	1.52	0.590	--		1
Ethyl Acetate	ND	0.500	--	ND	1.80	--		1
Tetrahydrofuran	ND	0.200	--	ND	0.590	--		1
n-Hexane	0.534	0.200	--	1.88	0.705	--		1
Cyclohexane	ND	0.200	--	ND	0.688	--		1
2,2,4-Trimethylpentane	ND	0.200	--	ND	0.934	--		1
4-Methyl-2-pentanone	ND	0.200	--	ND	0.820	--		1
2-Hexanone	ND	0.200	--	ND	0.820	--		1
4-Ethyltoluene	ND	0.200	--	ND	0.983	--		1

Internal Standard	**% Recovery**	**Qualifier**	**Acceptance Criteria**
1,4-Difluorobenzene	91		60-140
Bromochloromethane	106		60-140
chlorobenzene-d5	88		60-140

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1217119
Report Date: 10/31/12

SAMPLE RESULTS

Lab ID: L1217119-02
Client ID: DUP
Sample Location: BEVERLY, MA
Matrix: Air
Anaytical Method: 101,TO15-SIM
Analytical Date: 09/27/12 22:13
Analyst: RY

Date Collected: 09/22/12 16:30
Date Received: 09/24/12
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	Results	RL	MDL	Results	RL	MDL	Qualifier	Dilution Factor
MCP Volatile Organics in Air by SIM - Mansfield Lab								
1,1,1-Trichloroethane	0.021	0.020	--	0.114	0.109	--		1
1,1,1,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
1,1,2,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
1,1,2-Trichloroethane	ND	0.020	--	ND	0.109	--		1
1,1-Dichloroethane	ND	0.020	--	ND	0.081	--		1
1,1-Dichloroethene	ND	0.020	--	ND	0.079	--		1
1,2,4-Trichlorobenzene	ND	0.050	--	ND	0.371	--		1
1,2,4-Trimethylbenzene	0.521	0.020	--	2.56	0.098	--		1
1,2-Dibromoethane	ND	0.020	--	ND	0.154	--		1
1,2-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,2-Dichloroethane	0.040	0.020	--	0.162	0.081	--		1
1,2-Dichloropropane	ND	0.020	--	ND	0.092	--		1
1,3,5-Trimethybenzene	0.163	0.020	--	0.801	0.098	--		1
1,3-Butadiene	0.029	0.020	--	0.064	0.044	--		1
1,3-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,4-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
Benzene	0.121	0.100	--	0.386	0.319	--		1
Bromodichloromethane	0.022	0.020	--	0.147	0.134	--		1
Bromoform	ND	0.020	--	ND	0.207	--		1
Bromomethane	ND	0.020	--	ND	0.078	--		1
Carbon tetrachloride	0.051	0.020	--	0.321	0.126	--		1
Chlorobenzene	ND	0.020	--	ND	0.092	--		1
Chloroethane	ND	0.020	--	ND	0.053	--		1
Chloroform	0.163	0.020	--	0.796	0.098	--		1

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1217119
Report Date: 10/31/12

SAMPLE RESULTS

Lab ID: L1217119-02
Client ID: DUP
Sample Location: BEVERLY, MA
Date Collected: 09/22/12 16:30
Date Received: 09/24/12
Field Prep: Not Specified

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
MCP Volatile Organics in Air by SIM - Mansfield Lab								
Chloromethane	ND	0.500	--	ND	1.03	--		1
cis-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
cis-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
Dibromochloromethane	ND	0.020	--	ND	0.170	--		1
Dichlorodifluoromethane	0.231	0.050	--	1.14	0.247	--		1
Ethylbenzene	0.102	0.020	--	0.443	0.087	--		1
Freon-113	0.063	0.050	--	0.483	0.383	--		1
Freon-114	ND	0.050	--	ND	0.349	--		1
Hexachlorobutadiene	ND	0.050	--	ND	0.533	--		1
Methylene chloride	ND	1.40	--	ND	4.86	--		1
Methyl tert butyl ether	ND	0.020	--	ND	0.072	--		1
p/m-Xylene	0.370	0.040	--	1.61	0.174	--		1
o-Xylene	0.166	0.020	--	0.721	0.087	--		1
Styrene	0.257	0.020	--	1.09	0.085	--		1
Tetrachloroethene	0.035	0.020	--	0.237	0.136	--		1
Toluene	0.813	0.050	--	3.06	0.188	--		1
trans-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
trans-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
Trichloroethene	ND	0.020	--	ND	0.107	--		1
Trichlorofluoromethane	0.186	0.050	--	1.04	0.281	--		1
Vinyl chloride	ND	0.020	--	ND	0.051	--		1

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-difluorobenzene	103		60-140
bromochloromethane	100		60-140
chlorobenzene-d5	110		60-140

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1217119
Report Date: 10/31/12

SAMPLE RESULTS

Lab ID: L1217119-03
Client ID: S-157-J
Sample Location: BEVERLY, MA
Matrix: Air
Anaytical Method: 101,TO-15
Analytical Date: 10/16/12 20:29
Analyst: MB

Date Collected: 09/22/12 16:44
Date Received: 09/24/12
Field Prep: Not Specified

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
MCP Volatile Organics in Air - Mansfield Lab								
Propylene	ND	0.500	--	ND	0.860	--		1
Ethyl Alcohol	271	2.50	--	511	4.71	--		1
Acetone	29.8	1.00	--	70.8	2.38	--		1
iso-Propyl Alcohol	116	0.500	--	285	1.23	--	E	1
Carbon disulfide	ND	0.200	--	ND	0.623	--		1
2-Butanone	0.690	0.200	--	2.04	0.590	--		1
Ethyl Acetate	ND	0.500	--	ND	1.80	--		1
Tetrahydrofuran	ND	0.200	--	ND	0.590	--		1
n-Hexane	1.22	0.200	--	4.30	0.705	--		1
Cyclohexane	16.4	0.200	--	56.4	0.688	--		1
2,2,4-Trimethylpentane	ND	0.200	--	ND	0.934	--		1
4-Methyl-2-pentanone	0.285	0.200	--	1.17	0.820	--		1
2-Hexanone	ND	0.200	--	ND	0.820	--		1
4-Ethyltoluene	0.928	0.200	--	4.56	0.983	--		1

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-Difluorobenzene	91		60-140
Bromochloromethane	106		60-140
chlorobenzene-d5	84		60-140

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1217119
Report Date: 10/31/12

SAMPLE RESULTS

Lab ID: L1217119-03
Client ID: S-157-J
Sample Location: BEVERLY, MA
Matrix: Air
Anaytical Method: 101,TO15-SIM
Analytical Date: 09/27/12 22:45
Analyst: RY

Date Collected: 09/22/12 16:44
Date Received: 09/24/12
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
MCP Volatile Organics in Air by SIM - Mansfield Lab								
1,1,1-Trichloroethane	ND	0.020	--	ND	0.109	--		1
1,1,1,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
1,1,2,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
1,1,2-Trichloroethane	ND	0.020	--	ND	0.109	--		1
1,1-Dichloroethane	ND	0.020	--	ND	0.081	--		1
1,1-Dichloroethene	ND	0.020	--	ND	0.079	--		1
1,2,4-Trichlorobenzene	ND	0.050	--	ND	0.371	--		1
1,2,4-Trimethylbenzene	4.03	0.020	--	19.8	0.098	--		1
1,2-Dibromoethane	ND	0.020	--	ND	0.154	--		1
1,2-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,2-Dichloroethane	0.056	0.020	--	0.227	0.081	--		1
1,2-Dichloropropane	ND	0.020	--	ND	0.092	--		1
1,3,5-Trimethybenzene	1.06	0.020	--	5.21	0.098	--		1
1,3-Butadiene	0.026	0.020	--	0.058	0.044	--		1
1,3-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,4-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
Benzene	0.101	0.100	--	0.323	0.319	--		1
Bromodichloromethane	ND	0.020	--	ND	0.134	--		1
Bromoform	ND	0.020	--	ND	0.207	--		1
Bromomethane	ND	0.020	--	ND	0.078	--		1
Carbon tetrachloride	0.048	0.020	--	0.302	0.126	--		1
Chlorobenzene	ND	0.020	--	ND	0.092	--		1
Chloroethane	ND	0.020	--	ND	0.053	--		1
Chloroform	0.122	0.020	--	0.596	0.098	--		1

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1217119
Report Date: 10/31/12

SAMPLE RESULTS

Lab ID: L1217119-03
Client ID: S-157-J
Sample Location: BEVERLY, MA
Date Collected: 09/22/12 16:44
Date Received: 09/24/12
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
MCP Volatile Organics in Air by SIM - Mansfield Lab								
Chloromethane	ND	0.500	--	ND	1.03	--		1
cis-1,2-Dichloroethene	0.031	0.020	--	0.123	0.079	--		1
cis-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
Dibromochloromethane	ND	0.020	--	ND	0.170	--		1
Dichlorodifluoromethane	0.149	0.050	--	0.737	0.247	--		1
Ethylbenzene	0.135	0.020	--	0.586	0.087	--		1
Freon-113	0.065	0.050	--	0.498	0.383	--		1
Freon-114	ND	0.050	--	ND	0.349	--		1
Hexachlorobutadiene	ND	0.050	--	ND	0.533	--		1
Methylene chloride	3.02	1.40	--	10.5	4.86	--		1
Methyl tert butyl ether	ND	0.020	--	ND	0.072	--		1
p/m-Xylene	0.394	0.040	--	1.71	0.174	--		1
o-Xylene	0.221	0.020	--	0.960	0.087	--		1
Styrene	0.138	0.020	--	0.588	0.085	--		1
Tetrachloroethene	0.046	0.020	--	0.312	0.136	--		1
Toluene	0.708	0.050	--	2.67	0.188	--		1
trans-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
trans-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
Trichloroethene	ND	0.020	--	ND	0.107	--		1
Trichlorofluoromethane	0.205	0.050	--	1.15	0.281	--		1
Vinyl chloride	ND	0.020	--	ND	0.051	--		1

Internal Standard	**% Recovery**	**Qualifier**	**Acceptance Criteria**
1,4-difluorobenzene	111		60-140
bromochloromethane	104		60-140
chlorobenzene-d5	111		60-140

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1217119
Report Date: 10/31/12

SAMPLE RESULTS

Lab ID: L1217119-03 D
Client ID: S-157-J
Sample Location: BEVERLY, MA
Matrix: Air
Anaytical Method: 101,TO-15
Analytical Date: 10/17/12 09:19
Analyst: MB

Date Collected: 09/22/12 16:44
Date Received: 09/24/12
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
MCP Volatile Organics in Air - Mansfield Lab								
iso-Propyl Alcohol	95.8	1.00	--	235	2.46	--		2

Internal Standard	**% Recovery**	**Qualifier**	**Acceptance Criteria**
1,4-Difluorobenzene	105		60-140
Bromochloromethane	107		60-140
chlorobenzene-d5	95		60-140

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1217119
Report Date: 10/31/12

SAMPLE RESULTS

Lab ID: L1217119-04
Client ID: S-1100
Sample Location: BEVERLY, MA
Matrix: Air
Anaytical Method: 101,TO-15
Analytical Date: 10/16/12 21:01
Analyst: MB

Date Collected: 09/22/12 17:00
Date Received: 09/24/12
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
MCP Volatile Organics in Air - Mansfield Lab								
Propylene	ND	0.500	--	ND	0.860	--		1
Ethyl Alcohol	172	2.50	--	324	4.71	--		1
Acetone	8.30	1.00	--	19.7	2.38	--		1
iso-Propyl Alcohol	17.3	0.500	--	42.5	1.23	--		1
Carbon disulfide	ND	0.200	--	ND	0.623	--		1
2-Butanone	0.418	0.200	--	1.23	0.590	--		1
Ethyl Acetate	ND	0.500	--	ND	1.80	--		1
Tetrahydrofuran	0.227	0.200	--	0.669	0.590	--		1
n-Hexane	0.318	0.200	--	1.12	0.705	--		1
Cyclohexane	ND	0.200	--	ND	0.688	--		1
2,2,4-Trimethylpentane	ND	0.200	--	ND	0.934	--		1
4-Methyl-2-pentanone	ND	0.200	--	ND	0.820	--		1
2-Hexanone	ND	0.200	--	ND	0.820	--		1
4-Ethyltoluene	ND	0.200	--	ND	0.983	--		1

Internal Standard	**% Recovery**	**Qualifier**	**Acceptance Criteria**
1,4-Difluorobenzene	91		60-140
Bromochloromethane	95		60-140
chlorobenzene-d5	83		60-140

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1217119
Report Date: 10/31/12

SAMPLE RESULTS

Lab ID: L1217119-04
Client ID: S-1100
Sample Location: BEVERLY, MA
Matrix: Air
Anaytical Method: 101,TO15-SIM
Analytical Date: 09/27/12 23:16
Analyst: RY

Date Collected: 09/22/12 17:00
Date Received: 09/24/12
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
MCP Volatile Organics in Air by SIM - Mansfield Lab								
1,1,1-Trichloroethane	ND	0.020	--	ND	0.109	--		1
1,1,1,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
1,1,2,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
1,1,2-Trichloroethane	ND	0.020	--	ND	0.109	--		1
1,1-Dichloroethane	ND	0.020	--	ND	0.081	--		1
1,1-Dichloroethene	ND	0.020	--	ND	0.079	--		1
1,2,4-Trichlorobenzene	ND	0.050	--	ND	0.371	--		1
1,2,4-Trimethylbenzene	0.047	0.020	--	0.231	0.098	--		1
1,2-Dibromoethane	ND	0.020	--	ND	0.154	--		1
1,2-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,2-Dichloroethane	ND	0.020	--	ND	0.081	--		1
1,2-Dichloropropane	ND	0.020	--	ND	0.092	--		1
1,3,5-Trimethybenzene	ND	0.020	--	ND	0.098	--		1
1,3-Butadiene	ND	0.020	--	ND	0.044	--		1
1,3-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,4-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
Benzene	ND	0.100	--	ND	0.319	--		1
Bromodichloromethane	ND	0.020	--	ND	0.134	--		1
Bromoform	ND	0.020	--	ND	0.207	--		1
Bromomethane	ND	0.020	--	ND	0.078	--		1
Carbon tetrachloride	0.050	0.020	--	0.314	0.126	--		1
Chlorobenzene	ND	0.020	--	ND	0.092	--		1
Chloroethane	ND	0.020	--	ND	0.053	--		1
Chloroform	0.087	0.020	--	0.425	0.098	--		1

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1217119
Report Date: 10/31/12

SAMPLE RESULTS

Lab ID: L1217119-04
Client ID: S-1100
Sample Location: BEVERLY, MA
Date Collected: 09/22/12 17:00
Date Received: 09/24/12
Field Prep: Not Specified

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
MCP Volatile Organics in Air by SIM - Mansfield Lab								
Chloromethane	ND	0.500	--	ND	1.03	--		1
cis-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
cis-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
Dibromochloromethane	ND	0.020	--	ND	0.170	--		1
Dichlorodifluoromethane	0.153	0.050	--	0.756	0.247	--		1
Ethylbenzene	0.046	0.020	--	0.200	0.087	--		1
Freon-113	0.065	0.050	--	0.498	0.383	--		1
Freon-114	ND	0.050	--	ND	0.349	--		1
Hexachlorobutadiene	ND	0.050	--	ND	0.533	--		1
Methylene chloride	1.99	1.40	--	6.91	4.86	--		1
Methyl tert butyl ether	ND	0.020	--	ND	0.072	--		1
p/m-Xylene	0.121	0.040	--	0.526	0.174	--		1
o-Xylene	0.044	0.020	--	0.191	0.087	--		1
Styrene	0.031	0.020	--	0.132	0.085	--		1
Tetrachloroethene	0.038	0.020	--	0.258	0.136	--		1
Toluene	0.742	0.050	--	2.80	0.188	--		1
trans-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
trans-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
Trichloroethene	ND	0.020	--	ND	0.107	--		1
Trichlorofluoromethane	0.192	0.050	--	1.08	0.281	--		1
Vinyl chloride	ND	0.020	--	ND	0.051	--		1

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-difluorobenzene	114		60-140
bromochloromethane	106		60-140
chlorobenzene-d5	110		60-140

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1217119
Report Date: 10/31/12

SAMPLE RESULTS

Lab ID: L1217119-05
Client ID: S-171-X
Sample Location: BEVERLY, MA
Matrix: Air
Anaytical Method: 101,TO-15
Analytical Date: 10/16/12 21:33
Analyst: MB

Date Collected: 09/22/12 17:07
Date Received: 09/24/12
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
MCP Volatile Organics in Air - Mansfield Lab								
Propylene	ND	0.500	--	ND	0.860	--		1
Ethyl Alcohol	233	2.50	--	439	4.71	--		1
Acetone	13.9	1.00	--	33.0	2.38	--		1
iso-Propyl Alcohol	37.8	0.500	--	92.9	1.23	--		1
Carbon disulfide	ND	0.200	--	ND	0.623	--		1
2-Butanone	0.513	0.200	--	1.51	0.590	--		1
Ethyl Acetate	ND	0.500	--	ND	1.80	--		1
Tetrahydrofuran	ND	0.200	--	ND	0.590	--		1
n-Hexane	ND	0.200	--	ND	0.705	--		1
Cyclohexane	ND	0.200	--	ND	0.688	--		1
2,2,4-Trimethylpentane	ND	0.200	--	ND	0.934	--		1
4-Methyl-2-pentanone	ND	0.200	--	ND	0.820	--		1
2-Hexanone	ND	0.200	--	ND	0.820	--		1
4-Ethyltoluene	ND	0.200	--	ND	0.983	--		1

Internal Standard	**% Recovery**	**Qualifier**	**Acceptance Criteria**
1,4-Difluorobenzene	92		60-140
Bromochloromethane	107		60-140
chlorobenzene-d5	88		60-140

Project Name: CUMMINGS BEVERLY AIR SAMPLING **Lab Number:** L1217119

Project Number: 12201 **Report Date:** 10/31/12

SAMPLE RESULTS

Lab ID: L1217119-05
Client ID: S-171-X
Sample Location: BEVERLY, MA
Matrix: Air
Anaytical Method: 101,TO15-SIM
Analytical Date: 09/27/12 23:48
Analyst: RY

Date Collected: 09/22/12 17:07
Date Received: 09/24/12
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	Results	RL	MDL	Results	RL	MDL	Qualifier	Dilution Factor
MCP Volatile Organics in Air by SIM - Mansfield Lab								
1,1,1-Trichloroethane	ND	0.020	--	ND	0.109	--		1
1,1,1,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
1,1,2,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
1,1,2-Trichloroethane	ND	0.020	--	ND	0.109	--		1
1,1-Dichloroethane	ND	0.020	--	ND	0.081	--		1
1,1-Dichloroethene	ND	0.020	--	ND	0.079	--		1
1,2,4-Trichlorobenzene	ND	0.050	--	ND	0.371	--		1
1,2,4-Trimethylbenzene	0.041	0.020	--	0.202	0.098	--		1
1,2-Dibromoethane	ND	0.020	--	ND	0.154	--		1
1,2-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,2-Dichloroethane	0.037	0.020	--	0.150	0.081	--		1
1,2-Dichloropropane	ND	0.020	--	ND	0.092	--		1
1,3,5-Trimethybenzene	ND	0.020	--	ND	0.098	--		1
1,3-Butadiene	ND	0.020	--	ND	0.044	--		1
1,3-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,4-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
Benzene	0.100	0.100	--	0.319	0.319	--		1
Bromodichloromethane	ND	0.020	--	ND	0.134	--		1
Bromoform	ND	0.020	--	ND	0.207	--		1
Bromomethane	ND	0.020	--	ND	0.078	--		1
Carbon tetrachloride	0.048	0.020	--	0.302	0.126	--		1
Chlorobenzene	ND	0.020	--	ND	0.092	--		1
Chloroethane	ND	0.020	--	ND	0.053	--		1
Chloroform	0.156	0.020	--	0.762	0.098	--		1

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1217119
Report Date: 10/31/12

SAMPLE RESULTS

Lab ID: L1217119-05
Client ID: S-171-X
Sample Location: BEVERLY, MA
Date Collected: 09/22/12 17:07
Date Received: 09/24/12
Field Prep: Not Specified

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
MCP Volatile Organics in Air by SIM - Mansfield Lab								
Chloromethane	ND	0.500	--	ND	1.03	--		1
cis-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
cis-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
Dibromochloromethane	ND	0.020	--	ND	0.170	--		1
Dichlorodifluoromethane	0.173	0.050	--	0.855	0.247	--		1
Ethylbenzene	0.050	0.020	--	0.217	0.087	--		1
Freon-113	0.063	0.050	--	0.483	0.383	--		1
Freon-114	ND	0.050	--	ND	0.349	--		1
Hexachlorobutadiene	ND	0.050	--	ND	0.533	--		1
Methylene chloride	ND	1.40	--	ND	4.86	--		1
Methyl tert butyl ether	ND	0.020	--	ND	0.072	--		1
p/m-Xylene	0.122	0.040	--	0.530	0.174	--		1
o-Xylene	0.053	0.020	--	0.230	0.087	--		1
Styrene	0.096	0.020	--	0.409	0.085	--		1
Tetrachloroethene	0.031	0.020	--	0.210	0.136	--		1
Toluene	0.351	0.050	--	1.32	0.188	--		1
trans-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
trans-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
Trichloroethene	ND	0.020	--	ND	0.107	--		1
Trichlorofluoromethane	0.193	0.050	--	1.08	0.281	--		1
Vinyl chloride	ND	0.020	--	ND	0.051	--		1

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-difluorobenzene	105		60-140
bromochloromethane	102		60-140
chlorobenzene-d5	106		60-140

Project Name: CUMMINGS BEVERLY AIR SAMPLING **Lab Number:** L1217119

Project Number: 12201 **Report Date:** 10/31/12

SAMPLE RESULTS

Lab ID: L1217119-06
Client ID: NEPD
Sample Location: BEVERLY, MA
Matrix: Air
Anaytical Method: 101,TO-15
Analytical Date: 10/16/12 18:22
Analyst: MB

Date Collected: 09/22/12 17:18
Date Received: 09/24/12
Field Prep: Not Specified

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
MCP Volatile Organics in Air - Mansfield Lab								
Propylene	ND	0.500	--	ND	0.860	--		1
Ethyl Alcohol	ND	2.50	--	ND	4.71	--		1
Acetone	2.54	1.00	--	6.03	2.38	--		1
iso-Propyl Alcohol	ND	0.500	--	ND	1.23	--		1
Carbon disulfide	ND	0.200	--	ND	0.623	--		1
2-Butanone	0.236	0.200	--	0.696	0.590	--		1
Ethyl Acetate	ND	0.500	--	ND	1.80	--		1
Tetrahydrofuran	ND	0.200	--	ND	0.590	--		1
n-Hexane	0.652	0.200	--	2.30	0.705	--		1
Cyclohexane	ND	0.200	--	ND	0.688	--		1
2,2,4-Trimethylpentane	ND	0.200	--	ND	0.934	--		1
4-Methyl-2-pentanone	ND	0.200	--	ND	0.820	--		1
2-Hexanone	ND	0.200	--	ND	0.820	--		1
4-Ethyltoluene	ND	0.200	--	ND	0.983	--		1

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-Difluorobenzene	92		60-140
Bromochloromethane	107		60-140
chlorobenzene-d5	91		60-140

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1217119
Report Date: 10/31/12

SAMPLE RESULTS

Lab ID: L1217119-06
Client ID: NEPD
Sample Location: BEVERLY, MA
Matrix: Air
Anaytical Method: 101,TO15-SIM
Analytical Date: 09/28/12 00:19
Analyst: RY

Date Collected: 09/22/12 17:18
Date Received: 09/24/12
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
MCP Volatile Organics in Air by SIM - Mansfield Lab								
1,1,1-Trichloroethane	ND	0.020	--	ND	0.109	--		1
1,1,1,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
1,1,2,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
1,1,2-Trichloroethane	ND	0.020	--	ND	0.109	--		1
1,1-Dichloroethane	ND	0.020	--	ND	0.081	--		1
1,1-Dichloroethene	ND	0.020	--	ND	0.079	--		1
1,2,4-Trichlorobenzene	ND	0.050	--	ND	0.371	--		1
1,2,4-Trimethylbenzene	0.036	0.020	--	0.177	0.098	--		1
1,2-Dibromoethane	ND	0.020	--	ND	0.154	--		1
1,2-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,2-Dichloroethane	ND	0.020	--	ND	0.081	--		1
1,2-Dichloropropane	ND	0.020	--	ND	0.092	--		1
1,3,5-Trimethybenzene	ND	0.020	--	ND	0.098	--		1
1,3-Butadiene	ND	0.020	--	ND	0.044	--		1
1,3-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,4-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
Benzene	ND	0.100	--	ND	0.319	--		1
Bromodichloromethane	ND	0.020	--	ND	0.134	--		1
Bromoform	ND	0.020	--	ND	0.207	--		1
Bromomethane	ND	0.020	--	ND	0.078	--		1
Carbon tetrachloride	0.049	0.020	--	0.308	0.126	--		1
Chlorobenzene	ND	0.020	--	ND	0.092	--		1
Chloroethane	ND	0.020	--	ND	0.053	--		1
Chloroform	0.027	0.020	--	0.132	0.098	--		1

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1217119
Report Date: 10/31/12

SAMPLE RESULTS

Lab ID: L1217119-06
Client ID: NEPD
Sample Location: BEVERLY, MA
Date Collected: 09/22/12 17:18
Date Received: 09/24/12
Field Prep: Not Specified

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
MCP Volatile Organics in Air by SIM - Mansfield Lab								
Chloromethane	ND	0.500	--	ND	1.03	--		1
cis-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
cis-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
Dibromochloromethane	ND	0.020	--	ND	0.170	--		1
Dichlorodifluoromethane	0.198	0.050	--	0.979	0.247	--		1
Ethylbenzene	0.038	0.020	--	0.165	0.087	--		1
Freon-113	0.069	0.050	--	0.529	0.383	--		1
Freon-114	ND	0.050	--	ND	0.349	--		1
Hexachlorobutadiene	ND	0.050	--	ND	0.533	--		1
Methylene chloride	2.26	1.40	--	7.85	4.86	--		1
Methyl tert butyl ether	ND	0.020	--	ND	0.072	--		1
p/m-Xylene	0.113	0.040	--	0.491	0.174	--		1
o-Xylene	0.042	0.020	--	0.182	0.087	--		1
Styrene	ND	0.020	--	ND	0.085	--		1
Tetrachloroethene	0.041	0.020	--	0.278	0.136	--		1
Toluene	0.284	0.050	--	1.07	0.188	--		1
trans-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
trans-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
Trichloroethene	ND	0.020	--	ND	0.107	--		1
Trichlorofluoromethane	0.194	0.050	--	1.09	0.281	--		1
Vinyl chloride	ND	0.020	--	ND	0.051	--		1

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-difluorobenzene	110		60-140
bromochloromethane	104		60-140
chlorobenzene-d5	110		60-140

Project Name: CUMMINGS BEVERLY AIR SAMPLING **Lab Number:** L1217119

Project Number: 12201 **Report Date:** 10/31/12

Method Blank Analysis
Batch Quality Control

Analytical Method: 101,TO15-SIM
Analytical Date: 09/27/12 18:34

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
MCP Volatile Organics in Air by SIM - Mansfield Lab for sample(s): 01-06 Batch: WG563348-4								
1,1,1-Trichloroethane	ND	0.020	--	ND	0.109	--		1
1,1,1,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
1,1,2,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
1,1,2-Trichloroethane	ND	0.020	--	ND	0.109	--		1
1,1-Dichloroethane	ND	0.020	--	ND	0.081	--		1
1,1-Dichloroethene	ND	0.020	--	ND	0.079	--		1
1,2,4-Trichlorobenzene	ND	0.050	--	ND	0.371	--		1
1,2,4-Trimethylbenzene	ND	0.020	--	ND	0.098	--		1
1,2-Dibromoethane	ND	0.020	--	ND	0.154	--		1
1,2-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,2-Dichloroethane	ND	0.020	--	ND	0.081	--		1
1,2-Dichloropropane	ND	0.020	--	ND	0.092	--		1
1,3,5-Trimethybenzene	ND	0.020	--	ND	0.098	--		1
1,3-Butadiene	ND	0.020	--	ND	0.044	--		1
1,3-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,4-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
Benzene	ND	0.100	--	ND	0.319	--		1
Bromodichloromethane	ND	0.020	--	ND	0.134	--		1
Bromoform	ND	0.020	--	ND	0.207	--		1
Bromomethane	ND	0.020	--	ND	0.078	--		1
Carbon tetrachloride	ND	0.020	--	ND	0.126	--		1
Chlorobenzene	ND	0.020	--	ND	0.092	--		1
Chloroethane	ND	0.020	--	ND	0.053	--		1
Chloroform	ND	0.020	--	ND	0.098	--		1
Chloromethane	ND	0.500	--	ND	1.03	--		1

Project Name: CUMMINGS BEVERLY AIR SAMPLING **Lab Number:** L1217119

Project Number: 12201 **Report Date:** 10/31/12

Method Blank Analysis
Batch Quality Control

Analytical Method: 101,TO15-SIM
Analytical Date: 09/27/12 18:34

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
MCP Volatile Organics in Air by SIM - Mansfield Lab for sample(s): 01-06 Batch: WG563348-4								
cis-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
cis-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
Dibromochloromethane	ND	0.020	--	ND	0.170	--		1
Dichlorodifluoromethane	ND	0.050	--	ND	0.247	--		1
Ethylbenzene	ND	0.020	--	ND	0.087	--		1
Freon-113	ND	0.050	--	ND	0.383	--		1
Freon-114	ND	0.050	--	ND	0.349	--		1
Hexachlorobutadiene	ND	0.050	--	ND	0.533	--		1
Methylene chloride	ND	1.40	--	ND	4.86	--		1
Methyl tert butyl ether	ND	0.020	--	ND	0.072	--		1
p/m-Xylene	ND	0.040	--	ND	0.174	--		1
o-Xylene	ND	0.020	--	ND	0.087	--		1
Styrene	ND	0.020	--	ND	0.085	--		1
Tetrachloroethene	ND	0.020	--	ND	0.136	--		1
Toluene	ND	0.050	--	ND	0.188	--		1
trans-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
trans-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
Trichloroethene	ND	0.020	--	ND	0.107	--		1
Trichlorofluoromethane	ND	0.050	--	ND	0.281	--		1
Vinyl chloride	ND	0.020	--	ND	0.051	--		1

Project Name: CUMMINGS BEVERLY AIR SAMPLING **Lab Number:** L1217119

Project Number: 12201 **Report Date:** 10/31/12

Method Blank Analysis
Batch Quality Control

Analytical Method: 101,TO-15
Analytical Date: 10/16/12 16:06

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
MCP Volatile Organics in Air - Mansfield Lab for sample(s): 01-06 Batch: WG567428-4								
Propylene	ND	0.500	--	ND	0.860	--		1
Ethyl Alcohol	ND	2.50	--	ND	4.71	--		1
Acetone	ND	1.00	--	ND	2.38	--		1
iso-Propyl Alcohol	ND	0.500	--	ND	1.23	--		1
Carbon disulfide	ND	0.200	--	ND	0.623	--		1
2-Butanone	ND	0.200	--	ND	0.590	--		1
Ethyl Acetate	ND	0.500	--	ND	1.80	--		1
Tetrahydrofuran	ND	0.200	--	ND	0.590	--		1
n-Hexane	ND	0.200	--	ND	0.705	--		1
Cyclohexane	ND	0.200	--	ND	0.688	--		1
2,2,4-Trimethylpentane	ND	0.200	--	ND	0.934	--		1
4-Methyl-2-pentanone	ND	0.200	--	ND	0.820	--		1
2-Hexanone	ND	0.200	--	ND	0.820	--		1
4-Ethyltoluene	ND	0.200	--	ND	0.983	--		1

Lab Control Sample Analysis

Batch Quality Control

Project Name: CUMMINGS BEVERLY AIR SAMPLING

Project Number: 12201

Lab Number: L1217119

Report Date: 10/31/12

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
MCP Volatile Organics in Air by SIM - Mansfield Lab Associated sample(s): 01-06 Batch: WG563348-3								
1,1,1-Trichloroethane	85		-		70-130	-		
1,1,2,2-Tetrachloroethane	113		-		70-130	-		
1,1,2-Trichloroethane	93		-		70-130	-		
1,1-Dichloroethane	91		-		70-130	-		
1,1-Dichloroethene	92		-		70-130	-		
1,2,4-Trichlorobenzene	124		-		50-150	-		
1,2,4-Trimethylbenzene	114		-		70-130	-		
1,2-Dibromoethane	107		-		70-130	-		
1,2-Dichlorobenzene	117		-		70-130	-		
1,2-Dichloroethane	92		-		70-130	-		
1,2-Dichloropropane	88		-		70-130	-		
1,3,5-Trimethylbenzene	111		-		70-130	-		
1,3-Butadiene	92		-		70-130	-		
1,3-Dichlorobenzene	118		-		70-130	-		
1,4-Dichlorobenzene	117		-		70-130	-		
Benzene	85		-		70-130	-		
Bromodichloromethane	83		-		70-130	-		
Bromoform	102		-		70-130	-		
Bromomethane	88		-		70-130	-		
Carbon tetrachloride	85		-		70-130	-		
Chlorobenzene	109		-		70-130	-		

Lab Control Sample Analysis

Batch Quality Control

Project Name: CUMMINGS BEVERLY AIR SAMPLING

Project Number: 12201

Lab Number: L1217119

Report Date: 10/31/12

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
MCP Volatile Organics in Air by SIM - Mansfield Lab Associated sample(s): 01-06 Batch: WG563348-3								
Chloroethane	92		-		70-130	-		
Chloroform	98		-		70-130	-		
Chloromethane	91		-		70-130	-		
cis-1,2-Dichloroethene	101		-		70-130	-		
cis-1,3-Dichloropropene	87		-		70-130	-		
Dibromochloromethane	99		-		70-130	-		
Dichlorodifluoromethane	100		-		70-130	-		
Ethylbenzene	105		-		70-130	-		
1,1,2-Trichloro-1,2,2-Trifluoroethane	98		-		70-130	-		
1,2-Dichloro-1,1,2,2-tetrafluoroethane	107		-		70-130	-		
Hexachlorobutadiene	123		-		50-150	-		
Methylene chloride	91		-		70-130	-		
Methyl tert butyl ether	84		-		70-130	-		
p/m-Xylene	104		-		70-130	-		
o-Xylene	106		-		70-130	-		
Styrene	102		-		70-130	-		
Tetrachloroethene	107		-		70-130	-		
Toluene	97		-		70-130	-		
trans-1,2-Dichloroethene	82		-		70-130	-		
trans-1,3-Dichloropropene	73		-		70-130	-		
Trichloroethene	92		-		70-130	-		

Lab Control Sample Analysis

Batch Quality Control

Project Name: CUMMINGS BEVERLY AIR SAMPLING

Project Number: 12201

Lab Number: L1217119

Report Date: 10/31/12

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
MCP Volatile Organics in Air by SIM - Mansfield Lab Associated sample(s): 01-06 Batch: WG563348-3								
Trichlorofluoromethane	93		-		70-130	-		
Vinyl chloride	89		-		70-130	-		
MCP Volatile Organics in Air - Mansfield Lab Associated sample(s): 01-06 Batch: WG567428-3								
Propylene	107		-		70-130	-		
Ethyl Alcohol	105		-		70-130	-		
Acetone	105		-		50-150	-		
iso-Propyl Alcohol	95		-		70-130	-		
Carbon disulfide	98		-		70-130	-		
2-Butanone	98		-		70-130	-		
Ethyl Acetate	98		-		70-130	-		
Tetrahydrofuran	106		-		70-130	-		
n-Hexane	101		-		70-130	-		

Lab Control Sample Analysis

Batch Quality Control

Project Name: CUMMINGS BEVERLY AIR SAMPLING

Project Number: 12201

Lab Number: L1217119

Report Date: 10/31/12

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
MCP Volatile Organics in Air - Mansfield Lab Associated sample(s): 01-06 Batch: WG567428-3								
Cyclohexane	108		-		70-130	-		
2,2,4-Trimethylpentane	114		-		70-130	-		
4-Methyl-2-pentanone	117		-		70-130	-		
2-Hexanone	108		-		70-130	-		
4-Ethyltoluene	90		-		70-130	-		

Lab Duplicate Analysis
Batch Quality Control

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201

Lab Number: L1217119
Report Date: 10/31/12

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
MCP Volatile Organics in Air by SIM - Mansfield Lab Associated sample(s): 01-06 QC Batch ID: WG563348-5 QC Sample: L1217119-01 Client ID: S-149-J						
1,1,1-Trichloroethane	0.021	0.020	ppbV	5		25
1,1,1,2-Tetrachloroethane	ND	ND	ppbV	NC		25
1,1,2,2-Tetrachloroethane	ND	ND	ppbV	NC		25
1,1,2-Trichloroethane	ND	ND	ppbV	NC		25
1,1-Dichloroethane	ND	ND	ppbV	NC		25
1,1-Dichloroethene	ND	ND	ppbV	NC		25
1,2,4-Trichlorobenzene	ND	ND	ppbV	NC		25
1,2,4-Trimethylbenzene	0.518	0.542	ppbV	5		25
1,2-Dibromoethane	ND	ND	ppbV	NC		25
1,2-Dichlorobenzene	ND	ND	ppbV	NC		25
1,2-Dichloroethane	0.041	0.041	ppbV	0		25
1,2-Dichloropropane	ND	ND	ppbV	NC		25
1,3,5-Trimethybenzene	0.161	0.167	ppbV	4		25
1,3-Butadiene	0.025	0.027	ppbV	8		25
1,3-Dichlorobenzene	ND	ND	ppbV	NC		25
1,4-Dichlorobenzene	ND	ND	ppbV	NC		25
Benzene	0.124	0.122	ppbV	2		25
Bromodichloromethane	0.021	0.021	ppbV	0		25
Bromoform	ND	ND	ppbV	NC		25

Lab Duplicate Analysis
Batch Quality Control

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201

Lab Number: L1217119
Report Date: 10/31/12

Parameter	Native Sample	Duplicate Sample	Units	RPD	RPD Limits
MCP Volatile Organics in Air by SIM - Mansfield Lab Associated sample(s): 01-06 QC Batch ID: WG563348-5 QC Sample: L1217119-01 Client ID: S-149-J					
Bromomethane	ND	ND	ppbV	NC	25
Carbon tetrachloride	0.051	0.050	ppbV	2	25
Chlorobenzene	ND	ND	ppbV	NC	25
Chloroethane	ND	ND	ppbV	NC	25
Chloroform	0.163	0.167	ppbV	2	25
Chloromethane	ND	ND	ppbV	NC	25
cis-1,2-Dichloroethene	ND	ND	ppbV	NC	25
cis-1,3-Dichloropropene	ND	ND	ppbV	NC	25
Dibromochloromethane	ND	ND	ppbV	NC	25
Dichlorodifluoromethane	0.171	0.219	ppbV	25	25
Ethylbenzene	0.104	0.108	ppbV	4	25
Freon-113	0.062	0.064	ppbV	3	25
Freon-114	ND	ND	ppbV	NC	25
Hexachlorobutadiene	ND	ND	ppbV	NC	25
Methylene chloride	ND	ND	ppbV	NC	25
Methyl tert butyl ether	ND	ND	ppbV	NC	25
p/m-Xylene	0.375	0.387	ppbV	3	25
o-Xylene	0.167	0.172	ppbV	3	25
Styrene	0.250	0.259	ppbV	4	25

Lab Duplicate Analysis
Batch Quality Control

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201

Lab Number: L1217119
Report Date: 10/31/12

Parameter	Native Sample	Duplicate Sample	Units	RPD	RPD Limits
MCP Volatile Organics in Air by SIM - Mansfield Lab Associated sample(s): 01-06 QC Batch ID: WG563348-5 QC Sample: L1217119-01 Client ID: S-149-J					
Tetrachloroethene	0.069	0.078	ppbV	12	25
Toluene	0.843	0.867	ppbV	3	25
trans-1,2-Dichloroethene	ND	ND	ppbV	NC	25
trans-1,3-Dichloropropene	ND	ND	ppbV	NC	25
Trichloroethene	ND	ND	ppbV	NC	25
Trichlorofluoromethane	0.182	0.172	ppbV	6	25
Vinyl chloride	ND	ND	ppbV	NC	25

Lab Duplicate Analysis
Batch Quality Control

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201

Lab Number: L1217119
Report Date: 10/31/12

Parameter	Native Sample	Duplicate Sample	Units	RPD	RPD Limits
MCP Volatile Organics in Air - Mansfield Lab Associated sample(s): 01-06 QC Batch ID: WG567428-5 QC Sample: L1217119-02 Client ID: DUP					
Propylene	ND	ND	ppbV	NC	25
Ethyl Alcohol	99.3	107	ppbV	7	25
Acetone	23.5	26.6	ppbV	12	25
iso-Propyl Alcohol	48.0	58.4	ppbV	20	25
Carbon disulfide	ND	ND	ppbV	NC	25
2-Butanone	0.515	0.566	ppbV	9	25
Ethyl Acetate	ND	ND	ppbV	NC	25
Tetrahydrofuran	ND	ND	ppbV	NC	25
n-Hexane	0.534	0.474	ppbV	12	25
Cyclohexane	ND	ND	ppbV	NC	25
2,2,4-Trimethylpentane	ND	ND	ppbV	NC	25
4-Methyl-2-pentanone	ND	ND	ppbV	NC	25
2-Hexanone	ND	ND	ppbV	NC	25
4-Ethyltoluene	ND	ND	ppbV	NC	25

Project Name: CUMMINGS BEVERLY AIR SAMPLING **Lab Number:** L1217119

Project Number: 12201 **Report Date:** 10/31/12

SAMPLE RESULTS

Lab ID:	L1217119-01	Date Collected:	09/22/12 16:25
Client ID:	S-149-J	Date Received:	09/24/12
Sample Location:	BEVERLY, MA	Field Prep:	Not Specified
Matrix:	Air		
Analytical Method:	96,APH		
Analytical Date:	09/27/12 21:11		
Analyst:	MB		

Quality Control Information

Sample Type:	24 Hour Composite
Sample Container Type:	Canister - 6 Liter
Sampling Flow Controller:	Mechanical
Sampling Zone:	Unknown
Sampling Flow Meter RPD of pre & post-sampling calibration check:	<=20%
Were all QA/QC procedures REQUIRED by the method followed?	Yes
Were all performance/acceptance standards for the required procedures achieved?	Yes
Were significant modifications made to the method as specified in Sect 11.1.2?	No

Petroleum Hydrocarbons in Air - Mansfield Lab

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
1,3-Butadiene	ND		ug/m3	2.0	--	1
Methyl tert butyl ether	ND		ug/m3	2.0	--	1
Benzene	ND		ug/m3	2.0	--	1
Toluene	2.9		ug/m3	2.0	--	1
C5-C8 Aliphatics, Adjusted	110		ug/m3	12	--	1
Ethylbenzene	ND		ug/m3	2.0	--	1
p/m-Xylene	ND		ug/m3	4.0	--	1
o-Xylene	ND		ug/m3	2.0	--	1
Naphthalene	ND		ug/m3	2.0	--	1
C9-C12 Aliphatics, Adjusted	86		ug/m3	14	--	1
C9-C10 Aromatics Total	ND		ug/m3	10	--	1

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-Difluorobenzene	101		50-200
Bromochloromethane	104		50-200
Chlorobenzene-d5	101		50-200

Project Name: CUMMINGS BEVERLY AIR SAMPLING **Lab Number:** L1217119

Project Number: 12201 **Report Date:** 10/31/12

SAMPLE RESULTS

Lab ID:	L1217119-02	Date Collected:	09/22/12 16:30
Client ID:	DUP	Date Received:	09/24/12
Sample Location:	BEVERLY, MA	Field Prep:	Not Specified
Matrix:	Air		
Analytical Method:	96,APH		
Analytical Date:	09/27/12 22:13		
Analyst:	MB		

Quality Control Information

Sample Type:	24 Hour Composite
Sample Container Type:	Canister - 6 Liter
Sampling Flow Controller:	Mechanical
Sampling Zone:	Unknown
Sampling Flow Meter RPD of pre & post-sampling calibration check:	<=20%
Were all QA/QC procedures REQUIRED by the method followed?	Yes
Were all performance/acceptance standards for the required procedures achieved?	Yes
Were significant modifications made to the method as specified in Sect 11.1.2?	No

Petroleum Hydrocarbons in Air - Mansfield Lab

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
1,3-Butadiene	ND		ug/m3	2.0	--	1
Methyl tert butyl ether	ND		ug/m3	2.0	--	1
Benzene	ND		ug/m3	2.0	--	1
Toluene	2.9		ug/m3	2.0	--	1
C5-C8 Aliphatics, Adjusted	110		ug/m3	12	--	1
Ethylbenzene	ND		ug/m3	2.0	--	1
p/m-Xylene	ND		ug/m3	4.0	--	1
o-Xylene	ND		ug/m3	2.0	--	1
Naphthalene	ND		ug/m3	2.0	--	1
C9-C12 Aliphatics, Adjusted	82		ug/m3	14	--	1
C9-C10 Aromatics Total	ND		ug/m3	10	--	1

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-Difluorobenzene	100		50-200
Bromochloromethane	103		50-200
Chlorobenzene-d5	102		50-200

Project Name: CUMMINGS BEVERLY AIR SAMPLING **Lab Number:** L1217119

Project Number: 12201 **Report Date:** 10/31/12

SAMPLE RESULTS

Lab ID:	L1217119-03	Date Collected:	09/22/12 16:44
Client ID:	S-157-J	Date Received:	09/24/12
Sample Location:	BEVERLY, MA	Field Prep:	Not Specified
Matrix:	Air		
Analytical Method:	96,APH		
Analytical Date:	09/27/12 22:45		
Analyst:	MB		

Quality Control Information

Sample Type:	24 Hour Composite
Sample Container Type:	Canister - 6 Liter
Sampling Flow Controller:	Mechanical
Sampling Zone:	Unknown
Sampling Flow Meter RPD of pre & post-sampling calibration check:	<=20%
Were all QA/QC procedures REQUIRED by the method followed?	Yes
Were all performance/acceptance standards for the required procedures achieved?	Yes
Were significant modifications made to the method as specified in Sect 11.1.2?	No

Petroleum Hydrocarbons in Air - Mansfield Lab

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
1,3-Butadiene	ND		ug/m3	2.0	--	1
Methyl tert butyl ether	ND		ug/m3	2.0	--	1
Benzene	ND		ug/m3	2.0	--	1
Toluene	2.3		ug/m3	2.0	--	1
C5-C8 Aliphatics, Adjusted	320		ug/m3	12	--	1
Ethylbenzene	ND		ug/m3	2.0	--	1
p/m-Xylene	ND		ug/m3	4.0	--	1
o-Xylene	ND		ug/m3	2.0	--	1
Naphthalene	ND		ug/m3	2.0	--	1
C9-C12 Aliphatics, Adjusted	190		ug/m3	14	--	1
C9-C10 Aromatics Total	61		ug/m3	10	--	1

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-Difluorobenzene	108		50-200
Bromochloromethane	111		50-200
Chlorobenzene-d5	102		50-200

Project Name: CUMMINGS BEVERLY AIR SAMPLING **Lab Number:** L1217119

Project Number: 12201 **Report Date:** 10/31/12

SAMPLE RESULTS

Lab ID:	L1217119-04	Date Collected:	09/22/12 17:00
Client ID:	S-1100	Date Received:	09/24/12
Sample Location:	BEVERLY, MA	Field Prep:	Not Specified
Matrix:	Air		
Analytical Method:	96,APH		
Analytical Date:	09/27/12 23:16		
Analyst:	MB		

Quality Control Information

Sample Type:	24 Hour Composite
Sample Container Type:	Canister - 6 Liter
Sampling Flow Controller:	Mechanical
Sampling Zone:	Unknown
Sampling Flow Meter RPD of pre & post-sampling calibration check:	21%
Were all QA/QC procedures REQUIRED by the method followed?	Yes
Were all performance/acceptance standards for the required procedures achieved?	Yes
Were significant modifications made to the method as specified in Sect 11.1.2?	No

Petroleum Hydrocarbons in Air - Mansfield Lab

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
1,3-Butadiene	ND		ug/m3	2.0	--	1
Methyl tert butyl ether	ND		ug/m3	2.0	--	1
Benzene	ND		ug/m3	2.0	--	1
Toluene	2.4		ug/m3	2.0	--	1
C5-C8 Aliphatics, Adjusted	39		ug/m3	12	--	1
Ethylbenzene	ND		ug/m3	2.0	--	1
p/m-Xylene	ND		ug/m3	4.0	--	1
o-Xylene	ND		ug/m3	2.0	--	1
Naphthalene	ND		ug/m3	2.0	--	1
C9-C12 Aliphatics, Adjusted	16		ug/m3	14	--	1
C9-C10 Aromatics Total	ND		ug/m3	10	--	1

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-Difluorobenzene	110		50-200
Bromochloromethane	116		50-200
Chlorobenzene-d5	101		50-200

Project Name: CUMMINGS BEVERLY AIR SAMPLING **Lab Number:** L1217119

Project Number: 12201 **Report Date:** 10/31/12

SAMPLE RESULTS

Lab ID:	L1217119-05	Date Collected:	09/22/12 17:07
Client ID:	S-171-X	Date Received:	09/24/12
Sample Location:	BEVERLY, MA	Field Prep:	Not Specified
Matrix:	Air		
Analytical Method:	96,APH		
Analytical Date:	09/27/12 23:48		
Analyst:	MB		

Quality Control Information

Sample Type:	24 Hour Composite
Sample Container Type:	Canister - 6 Liter
Sampling Flow Controller:	Mechanical
Sampling Zone:	Unknown
Sampling Flow Meter RPD of pre & post-sampling calibration check:	<=20%
Were all QA/QC procedures REQUIRED by the method followed?	Yes
Were all performance/acceptance standards for the required procedures achieved?	Yes
Were significant modifications made to the method as specified in Sect 11.1.2?	No

Petroleum Hydrocarbons in Air - Mansfield Lab

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
1,3-Butadiene	ND		ug/m3	2.0	--	1
Methyl tert butyl ether	ND		ug/m3	2.0	--	1
Benzene	ND		ug/m3	2.0	--	1
Toluene	ND		ug/m3	2.0	--	1
C5-C8 Aliphatics, Adjusted	100		ug/m3	12	--	1
Ethylbenzene	ND		ug/m3	2.0	--	1
p/m-Xylene	ND		ug/m3	4.0	--	1
o-Xylene	ND		ug/m3	2.0	--	1
Naphthalene	ND		ug/m3	2.0	--	1
C9-C12 Aliphatics, Adjusted	71		ug/m3	14	--	1
C9-C10 Aromatics Total	ND		ug/m3	10	--	1

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-Difluorobenzene	102		50-200
Bromochloromethane	108		50-200
Chlorobenzene-d5	99		50-200

Project Name: CUMMINGS BEVERLY AIR SAMPLING **Lab Number:** L1217119

Project Number: 12201 **Report Date:** 10/31/12

SAMPLE RESULTS

Lab ID:	L1217119-06	Date Collected:	09/22/12 17:18
Client ID:	NEPD	Date Received:	09/24/12
Sample Location:	BEVERLY, MA	Field Prep:	Not Specified
Matrix:	Air		
Analytical Method:	96,APH		
Analytical Date:	09/28/12 00:19		
Analyst:	MB		

Quality Control Information

Sample Type:	24 Hour Composite
Sample Container Type:	Canister - 6 Liter
Sampling Flow Controller:	Mechanical
Sampling Zone:	Unknown
Sampling Flow Meter RPD of pre & post-sampling calibration check:	<=20%
Were all QA/QC procedures REQUIRED by the method followed?	Yes
Were all performance/acceptance standards for the required procedures achieved?	Yes
Were significant modifications made to the method as specified in Sect 11.1.2?	No

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Petroleum Hydrocarbons in Air - Mansfield Lab						
1,3-Butadiene	ND		ug/m3	2.0	--	1
Methyl tert butyl ether	ND		ug/m3	2.0	--	1
Benzene	ND		ug/m3	2.0	--	1
Toluene	ND		ug/m3	2.0	--	1
C5-C8 Aliphatics, Adjusted	ND		ug/m3	12	--	1
Ethylbenzene	ND		ug/m3	2.0	--	1
p/m-Xylene	ND		ug/m3	4.0	--	1
o-Xylene	ND		ug/m3	2.0	--	1
Naphthalene	ND		ug/m3	2.0	--	1
C9-C12 Aliphatics, Adjusted	ND		ug/m3	14	--	1
C9-C10 Aromatics Total	ND		ug/m3	10	--	1

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-Difluorobenzene	107		50-200
Bromochloromethane	111		50-200
Chlorobenzene-d5	102		50-200

Project Name: CUMMINGS BEVERLY AIR SAMPLING **Lab Number:** L1217119

Project Number: 12201 **Report Date:** 10/31/12

Method Blank Analysis
Batch Quality Control

Analytical Method: 96,APH
Analytical Date: 09/27/12 18:34
Analyst: MB

Parameter	Result	Qualifier	Units	RL	MDL
Petroleum Hydrocarbons in Air - Mansfield Lab for sample(s): 01-06 Batch: WG563347-4					
1,3-Butadiene	ND		ug/m3	2.0	--
Methyl tert butyl ether	ND		ug/m3	2.0	--
Benzene	ND		ug/m3	2.0	--
Toluene	ND		ug/m3	2.0	--
C5-C8 Aliphatics, Adjusted	ND		ug/m3	12	--
Ethylbenzene	ND		ug/m3	2.0	--
p/m-Xylene	ND		ug/m3	4.0	--
o-Xylene	ND		ug/m3	2.0	--
Naphthalene	ND		ug/m3	2.0	--
C9-C12 Aliphatics, Adjusted	ND		ug/m3	14	--
C9-C10 Aromatics Total	ND		ug/m3	10	--

Lab Control Sample Analysis

Batch Quality Control

Project Name: CUMMINGS BEVERLY AIR SAMPLING

Project Number: 12201

Lab Number: L1217119

Report Date: 10/31/12

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Petroleum Hydrocarbons in Air - Mansfield Lab Associated sample(s): 01-06 Batch: WG563347-3								
1,3-Butadiene	92		-		70-130	-		
Methyl tert butyl ether	90		-		70-130	-		
Benzene	85		-		70-130	-		
Toluene	86		-		70-130	-		
C5-C8 Aliphatics, Adjusted	86		-		70-130	-		
Ethylbenzene	93		-		70-130	-		
p/m-Xylene	92		-		70-130	-		
o-Xylene	95		-		70-130	-		
Naphthalene	126		-		50-150	-		
C9-C12 Aliphatics, Adjusted	109		-		70-130	-		
C9-C10 Aromatics Total	93		-		70-130	-		

Lab Duplicate Analysis
Batch Quality Control

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201

Lab Number: L1217119
Report Date: 10/31/12

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Petroleum Hydrocarbons in Air - Mansfield Lab Associated sample(s): 01-06 QC Batch ID: WG563347-5 QC Sample: L1217119-01 Client ID: S-149-J						
1,3-Butadiene	ND	ND	ug/m3	NC		30
Methyl tert butyl ether	ND	ND	ug/m3	NC		30
Benzene	ND	ND	ug/m3	NC		30
Toluene	2.9	2.9	ug/m3	0		30
C5-C8 Aliphatics, Adjusted	110	100	ug/m3	10		30
Ethylbenzene	ND	ND	ug/m3	NC		30
p/m-Xylene	ND	ND	ug/m3	NC		30
o-Xylene	ND	ND	ug/m3	NC		30
Naphthalene	ND	ND	ug/m3	NC		30
C9-C12 Aliphatics, Adjusted	86	90	ug/m3	5		30
C9-C10 Aromatics Total	ND	ND	ug/m3	NC		30

Project Name: CUMMINGS BEVERLY AIR SAMPLING **Lab Number:** L1217119

Project Number: 12201 **Report Date:** 10/31/12

Canister and Flow Controller Information

Samplenum	Client ID	Media ID	Media Type	Date Prepared	Bottle Order	Cleaning Batch ID	Can Leak Check	Initial Pressure (in. Hg)	Pressure on Receipt (in. Hg)	Flow Controler Leak Chk	Flow Out mL/min	Flow In mL/min	% RPD
L1217119-01	S-149-J	0264	#16 AMB	09/17/12	81307		-	-	-	Pass	3.3	3.0	10
L1217119-01	S-149-J	1531	6.0L Can	09/17/12	81307	L1215735-03	Pass	-29.4	-7.7	-	-	-	-
L1217119-02	DUP	0131	#16 AMB	09/17/12	81307		-	-	-	Pass	3.3	2.9	13
L1217119-02	DUP	934	6.0L Can	09/17/12	81307	L1215735-04	Pass	-29.6	-7.5	-	-	-	-
L1217119-03	S-157-J	0330	#16 AMB	09/17/12	81307		-	-	-	Pass	3.1	2.7	14
L1217119-03	S-157-J	1640	6.0L Can	09/17/12	81307	L1215735-03	Pass	-29.6	-9.5	-	-	-	-
L1217119-04	S-1100	0194	#16 AMB	09/17/12	81307		-	-	-	Pass	3.2	2.6	21
L1217119-04	S-1100	943	6.0L Can	09/17/12	81307	L1215735-04	Pass	-29.5	-10.2	-	-	-	-
L1217119-05	S-171-X	0500	#16 AMB	09/17/12	81307		-	-	-	Pass	3.3	2.9	13
L1217119-05	S-171-X	1632	6.0L Can	09/17/12	81307	L1215735-03	Pass	-29.0	-7.4	-	-	-	-
L1217119-06	NEPD	0145	#16 AMB	09/17/12	81307		-	-	-	Pass	3.3	3.0	10
L1217119-06	NEPD	1629	6.0L Can	09/17/12	81307	L1215735-04	Pass	-28.6	-4.0	-	-	-	-

Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT
Lab Number: L1215735
Report Date: 10/31/12

Air Canister Certification Results

Lab ID: L1215735-03
Client ID: CAN 1632 SHELF 46
Sample Location:
Matrix: Air
Anaytical Method: 48,TO-15
Analytical Date: 09/05/12 17:29
Analyst: RY

Date Collected: 09/04/12 08:57
Date Received: 09/05/12
Field Prep: Not Specified

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air - Mansfield Lab								
Chlorodifluoromethane	ND	0.200	--	ND	0.707	--		1
Propylene	ND	0.500	--	ND	0.860	--		1
Propane	ND	0.200	--	ND	0.361	--		1
Dichlorodifluoromethane	ND	0.200	--	ND	0.989	--		1
Chloromethane	ND	0.200	--	ND	0.413	--		1
Freon-114	ND	0.200	--	ND	1.40	--		1
Methanol	ND	5.00	--	ND	6.55	--		1
Vinyl chloride	ND	0.200	--	ND	0.511	--		1
1,3-Butadiene	ND	0.200	--	ND	0.442	--		1
Butane	ND	0.200	--	ND	0.475	--		1
Bromomethane	ND	0.200	--	ND	0.777	--		1
Chloroethane	ND	0.200	--	ND	0.528	--		1
Ethanol	ND	2.50	--	ND	4.71	--		1
Dichlorofluoromethane	ND	0.200	--	ND	0.842	--		1
Vinyl bromide	ND	0.200	--	ND	0.874	--		1
Acrolein	ND	0.500	--	ND	1.15	--		1
Acetone	ND	1.00	--	ND	2.38	--		1
Acetonitrile	ND	0.200	--	ND	0.336	--		1
Trichlorofluoromethane	ND	0.200	--	ND	1.12	--		1
Isopropanol	ND	0.500	--	ND	1.23	--		1
Acrylonitrile	ND	0.200	--	ND	0.434	--		1
Pentane	ND	0.200	--	ND	0.590	--		1
Ethyl ether	ND	0.200	--	ND	0.606	--		1
1,1-Dichloroethene	ND	0.200	--	ND	0.793	--		1
Tertiary butyl Alcohol	ND	0.500	--	ND	1.52	--		1

Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT
Lab Number: L1215735
Report Date: 10/31/12

Air Canister Certification Results

Lab ID: L1215735-03
Client ID: CAN 1632 SHELF 46
Sample Location:
Date Collected: 09/04/12 08:57
Date Received: 09/05/12
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air - Mansfield Lab								
Methylene chloride	ND	1.00	--	ND	3.47	--		1
3-Chloropropene	ND	0.200	--	ND	0.626	--		1
Carbon disulfide	ND	0.200	--	ND	0.623	--		1
Freon-113	ND	0.200	--	ND	1.53	--		1
trans-1,2-Dichloroethene	ND	0.200	--	ND	0.793	--		1
1,1-Dichloroethane	ND	0.200	--	ND	0.809	--		1
Methyl tert butyl ether	ND	0.200	--	ND	0.721	--		1
Vinyl acetate	ND	0.200	--	ND	0.704	--		1
2-Butanone	ND	0.200	--	ND	0.590	--		1
cis-1,2-Dichloroethene	ND	0.200	--	ND	0.793	--		1
Ethyl Acetate	ND	0.500	--	ND	1.80	--		1
Chloroform	ND	0.200	--	ND	0.977	--		1
Tetrahydrofuran	ND	0.200	--	ND	0.590	--		1
2,2-Dichloropropane	ND	0.200	--	ND	0.924	--		1
1,2-Dichloroethane	ND	0.200	--	ND	0.809	--		1
n-Hexane	ND	0.200	--	ND	0.705	--		1
Diisopropyl ether	ND	0.200	--	ND	0.836	--		1
tert-Butyl Ethyl Ether	ND	0.200	--	ND	0.836	--		1
1,1,1-Trichloroethane	ND	0.200	--	ND	1.09	--		1
1,1-Dichloropropene	ND	0.200	--	ND	0.908	--		1
Benzene	ND	0.200	--	ND	0.639	--		1
Carbon tetrachloride	ND	0.200	--	ND	1.26	--		1
Cyclohexane	ND	0.200	--	ND	0.688	--		1
tert-Amyl Methyl Ether	ND	0.200	--	ND	0.836	--		1
Dibromomethane	ND	0.200	--	ND	1.42	--		1
1,2-Dichloropropane	ND	0.200	--	ND	0.924	--		1
Bromodichloromethane	ND	0.200	--	ND	1.34	--		1
1,4-Dioxane	ND	0.200	--	ND	0.721	--		1

Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT
Lab Number: L1215735
Report Date: 10/31/12

Air Canister Certification Results

Lab ID: L1215735-03
Client ID: CAN 1632 SHELF 46
Sample Location:
Date Collected: 09/04/12 08:57
Date Received: 09/05/12
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air - Mansfield Lab								
Trichloroethene	ND	0.200	--	ND	1.07	--		1
2,2,4-Trimethylpentane	ND	0.200	--	ND	0.934	--		1
Methyl Methacrylate	ND	0.500	--	ND	2.05	--		1
Heptane	ND	0.200	--	ND	0.820	--		1
cis-1,3-Dichloropropene	ND	0.200	--	ND	0.908	--		1
4-Methyl-2-pentanone	ND	0.200	--	ND	0.820	--		1
trans-1,3-Dichloropropene	ND	0.200	--	ND	0.908	--		1
1,1,2-Trichloroethane	ND	0.200	--	ND	1.09	--		1
Toluene	ND	0.200	--	ND	0.754	--		1
1,3-Dichloropropane	ND	0.200	--	ND	0.924	--		1
2-Hexanone	ND	0.200	--	ND	0.820	--		1
Dibromochloromethane	ND	0.200	--	ND	1.70	--		1
1,2-Dibromoethane	ND	0.200	--	ND	1.54	--		1
Butyl acetate	ND	0.500	--	ND	2.38	--		1
Octane	ND	0.200	--	ND	0.934	--		1
Tetrachloroethene	ND	0.200	--	ND	1.36	--		1
1,1,1,2-Tetrachloroethane	ND	0.200	--	ND	1.37	--		1
Chlorobenzene	ND	0.200	--	ND	0.921	--		1
Ethylbenzene	ND	0.200	--	ND	0.869	--		1
p/m-Xylene	ND	0.400	--	ND	1.74	--		1
Bromoform	ND	0.200	--	ND	2.07	--		1
Styrene	ND	0.200	--	ND	0.852	--		1
1,1,2,2-Tetrachloroethane	ND	0.200	--	ND	1.37	--		1
o-Xylene	ND	0.200	--	ND	0.869	--		1
1,2,3-Trichloropropane	ND	0.200	--	ND	1.20	--		1
Nonane	ND	0.200	--	ND	1.05	--		1
Isopropylbenzene	ND	0.200	--	ND	0.983	--		1
Bromobenzene	ND	0.200	--	ND	0.793	--		1

Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT
Lab Number: L1215735
Report Date: 10/31/12

Air Canister Certification Results

Lab ID: L1215735-03
Client ID: CAN 1632 SHELF 46
Sample Location:
Date Collected: 09/04/12 08:57
Date Received: 09/05/12
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air - Mansfield Lab								
2-Chlorotoluene	ND	0.200	--	ND	1.04	--		1
n-Propylbenzene	ND	0.200	--	ND	0.983	--		1
4-Chlorotoluene	ND	0.200	--	ND	1.04	--		1
4-Ethyltoluene	ND	0.200	--	ND	0.983	--		1
1,3,5-Trimethybenzene	ND	0.200	--	ND	0.983	--		1
tert-Butylbenzene	ND	0.200	--	ND	1.10	--		1
1,2,4-Trimethylbenzene	ND	0.200	--	ND	0.983	--		1
Decane	ND	0.200	--	ND	1.16	--		1
Benzyl chloride	ND	0.200	--	ND	1.04	--		1
1,3-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
1,4-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
sec-Butylbenzene	ND	0.200	--	ND	1.10	--		1
p-Isopropyltoluene	ND	0.200	--	ND	1.10	--		1
1,2-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
n-Butylbenzene	ND	0.200	--	ND	1.10	--		1
1,2-Dibromo-3-chloropropane	ND	0.200	--	ND	1.93	--		1
Undecane	ND	0.200	--	ND	1.28	--		1
Dodecane	ND	0.200	--	ND	1.39	--		1
1,2,4-Trichlorobenzene	ND	0.200	--	ND	1.48	--		1
Naphthalene	ND	0.200	--	ND	1.05	--		1
1,2,3-Trichlorobenzene	ND	0.200	--	ND	1.48	--		1
Hexachlorobutadiene	ND	0.200	--	ND	2.13	--		1

	Results	**Qualifier**	**Units**	**RDL**	**Dilution Factor**
Tentatively Identified Compounds					
No Tentatively Identified Compounds					

Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT
Lab Number: L1215735
Report Date: 10/31/12

Air Canister Certification Results

Lab ID: L1215735-03
Client ID: CAN 1632 SHELF 46
Sample Location:
Date Collected: 09/04/12 08:57
Date Received: 09/05/12
Field Prep: Not Specified

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air - Mansfield Lab								

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-Difluorobenzene	104		60-140
Bromochloromethane	104		60-140
chlorobenzene-d5	99		60-140

Project Name: BATCH CANISTER CERTIFICATION **Lab Number:** L1215735

Project Number: CANISTER QC BAT **Report Date:** 10/31/12

Air Canister Certification Results

Lab ID: L1215735-03
Client ID: CAN 1632 SHELF 46
Sample Location:
Matrix: Air
Anaytical Method: 48,TO-15-SIM
Analytical Date: 09/05/12 17:29
Analyst: MB

Date Collected: 09/04/12 08:57
Date Received: 09/05/12
Field Prep: Not Specified

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air by SIM - Mansfield Lab								
Dichlorodifluoromethane	ND	0.050	--	ND	0.247	--		1
Chloromethane	ND	0.500	--	ND	1.03	--		1
Freon-114	ND	0.050	--	ND	0.349	--		1
Vinyl chloride	ND	0.020	--	ND	0.051	--		1
1,3-Butadiene	ND	0.020	--	ND	0.044	--		1
Bromomethane	ND	0.020	--	ND	0.078	--		1
Chloroethane	ND	0.020	--	ND	0.053	--		1
Acetone	ND	2.00	--	ND	4.75	--		1
Trichlorofluoromethane	ND	0.050	--	ND	0.281	--		1
Acrylonitrile	ND	0.500	--	ND	1.08	--		1
1,1-Dichloroethene	ND	0.020	--	ND	0.079	--		1
Methylene chloride	ND	1.00	--	ND	3.47	--		1
Freon-113	ND	0.050	--	ND	0.383	--		1
Halothane	ND	0.050	--	ND	0.404	--		1
trans-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
1,1-Dichloroethane	ND	0.020	--	ND	0.081	--		1
Methyl tert butyl ether	ND	0.020	--	ND	0.072	--		1
2-Butanone	ND	0.500	--	ND	1.47	--		1
cis-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
Chloroform	ND	0.020	--	ND	0.098	--		1
1,2-Dichloroethane	ND	0.020	--	ND	0.081	--		1
1,1,1-Trichloroethane	ND	0.020	--	ND	0.109	--		1
Benzene	ND	0.100	--	ND	0.319	--		1
Carbon tetrachloride	ND	0.020	--	ND	0.126	--		1
1,2-Dichloropropane	ND	0.020	--	ND	0.092	--		1

Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT
Lab Number: L1215735
Report Date: 10/31/12

Air Canister Certification Results

Lab ID: L1215735-03
Client ID: CAN 1632 SHELF 46
Sample Location:
Date Collected: 09/04/12 08:57
Date Received: 09/05/12
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air by SIM - Mansfield Lab								
Bromodichloromethane	ND	0.020	--	ND	0.134	--		1
Trichloroethene	ND	0.020	--	ND	0.107	--		1
1,4-Dioxane	ND	0.100	--	ND	0.360	--		1
cis-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
4-Methyl-2-pentanone	ND	0.500	--	ND	2.05	--		1
trans-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
1,1,2-Trichloroethane	ND	0.020	--	ND	0.109	--		1
Toluene	ND	0.050	--	ND	0.188	--		1
Dibromochloromethane	ND	0.020	--	ND	0.170	--		1
1,2-Dibromoethane	ND	0.020	--	ND	0.154	--		1
Tetrachloroethene	ND	0.020	--	ND	0.136	--		1
1,1,1,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
Chlorobenzene	ND	0.020	--	ND	0.092	--		1
Ethylbenzene	ND	0.020	--	ND	0.087	--		1
p/m-Xylene	ND	0.040	--	ND	0.174	--		1
Bromoform	ND	0.020	--	ND	0.207	--		1
Styrene	ND	0.020	--	ND	0.085	--		1
1,1,2,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
o-Xylene	ND	0.020	--	ND	0.087	--		1
Isopropylbenzene	ND	0.500	--	ND	2.46	--		1
1,3,5-Trimethybenzene	ND	0.020	--	ND	0.098	--		1
1,2,4-Trimethylbenzene	ND	0.020	--	ND	0.098	--		1
1,3-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,4-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
sec-Butylbenzene	ND	0.500	--	ND	2.74	--		1
p-Isopropyltoluene	ND	0.500	--	ND	2.74	--		1
1,2-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
n-Butylbenzene	ND	0.500	--	ND	2.74	--		1

Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT

Lab Number: L1215735
Report Date: 10/31/12

Air Canister Certification Results

Lab ID: L1215735-03
Client ID: CAN 1632 SHELF 46
Sample Location:

Date Collected: 09/04/12 08:57
Date Received: 09/05/12
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air by SIM - Mansfield Lab								
1,2,4-Trichlorobenzene	ND	0.050	--	ND	0.371	--		1
Naphthalene	ND	0.050	--	ND	0.262	--		1
1,2,3-Trichlorobenzene	ND	0.050	--	ND	0.371	--		1
Hexachlorobutadiene	ND	0.050	--	ND	0.533	--		1

Internal Standard	**% Recovery**	**Qualifier**	**Acceptance Criteria**
1,4-difluorobenzene	96		60-140
bromochloromethane	96		60-140
chlorobenzene-d5	101		60-140

Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT
Lab Number: L1215735
Report Date: 10/31/12

Air Canister Certification Results

Lab ID: L1215735-04
Client ID: CAN 1648 SHELF 52
Sample Location:
Matrix: Air
Anaytical Method: 48,TO-15
Analytical Date: 09/05/12 18:00
Analyst: RY

Date Collected: 09/04/12 09:11
Date Received: 09/05/12
Field Prep: Not Specified

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air - Mansfield Lab								
Chlorodifluoromethane	ND	0.200	--	ND	0.707	--		1
Propylene	ND	0.500	--	ND	0.860	--		1
Propane	ND	0.200	--	ND	0.361	--		1
Dichlorodifluoromethane	ND	0.200	--	ND	0.989	--		1
Chloromethane	ND	0.200	--	ND	0.413	--		1
Freon-114	ND	0.200	--	ND	1.40	--		1
Methanol	ND	5.00	--	ND	6.55	--		1
Vinyl chloride	ND	0.200	--	ND	0.511	--		1
1,3-Butadiene	ND	0.200	--	ND	0.442	--		1
Butane	ND	0.200	--	ND	0.475	--		1
Bromomethane	ND	0.200	--	ND	0.777	--		1
Chloroethane	ND	0.200	--	ND	0.528	--		1
Ethanol	ND	2.50	--	ND	4.71	--		1
Dichlorofluoromethane	ND	0.200	--	ND	0.842	--		1
Vinyl bromide	ND	0.200	--	ND	0.874	--		1
Acrolein	ND	0.500	--	ND	1.15	--		1
Acetone	ND	1.00	--	ND	2.38	--		1
Acetonitrile	ND	0.200	--	ND	0.336	--		1
Trichlorofluoromethane	ND	0.200	--	ND	1.12	--		1
Isopropanol	ND	0.500	--	ND	1.23	--		1
Acrylonitrile	ND	0.200	--	ND	0.434	--		1
Pentane	ND	0.200	--	ND	0.590	--		1
Ethyl ether	ND	0.200	--	ND	0.606	--		1
1,1-Dichloroethene	ND	0.200	--	ND	0.793	--		1
Tertiary butyl Alcohol	ND	0.500	--	ND	1.52	--		1

Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT
Lab Number: L1215735
Report Date: 10/31/12

Air Canister Certification Results

Lab ID: L1215735-04
Client ID: CAN 1648 SHELF 52
Sample Location:
Date Collected: 09/04/12 09:11
Date Received: 09/05/12
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air - Mansfield Lab								
Methylene chloride	ND	1.00	--	ND	3.47	--		1
3-Chloropropene	ND	0.200	--	ND	0.626	--		1
Carbon disulfide	ND	0.200	--	ND	0.623	--		1
Freon-113	ND	0.200	--	ND	1.53	--		1
trans-1,2-Dichloroethene	ND	0.200	--	ND	0.793	--		1
1,1-Dichloroethane	ND	0.200	--	ND	0.809	--		1
Methyl tert butyl ether	ND	0.200	--	ND	0.721	--		1
Vinyl acetate	ND	0.200	--	ND	0.704	--		1
2-Butanone	ND	0.200	--	ND	0.590	--		1
cis-1,2-Dichloroethene	ND	0.200	--	ND	0.793	--		1
Ethyl Acetate	ND	0.500	--	ND	1.80	--		1
Chloroform	ND	0.200	--	ND	0.977	--		1
Tetrahydrofuran	ND	0.200	--	ND	0.590	--		1
2,2-Dichloropropane	ND	0.200	--	ND	0.924	--		1
1,2-Dichloroethane	ND	0.200	--	ND	0.809	--		1
n-Hexane	ND	0.200	--	ND	0.705	--		1
Diisopropyl ether	ND	0.200	--	ND	0.836	--		1
tert-Butyl Ethyl Ether	ND	0.200	--	ND	0.836	--		1
1,1,1-Trichloroethane	ND	0.200	--	ND	1.09	--		1
1,1-Dichloropropene	ND	0.200	--	ND	0.908	--		1
Benzene	ND	0.200	--	ND	0.639	--		1
Carbon tetrachloride	ND	0.200	--	ND	1.26	--		1
Cyclohexane	ND	0.200	--	ND	0.688	--		1
tert-Amyl Methyl Ether	ND	0.200	--	ND	0.836	--		1
Dibromomethane	ND	0.200	--	ND	1.42	--		1
1,2-Dichloropropane	ND	0.200	--	ND	0.924	--		1
Bromodichloromethane	ND	0.200	--	ND	1.34	--		1
1,4-Dioxane	ND	0.200	--	ND	0.721	--		1

Project Name: BATCH CANISTER CERTIFICATION **Lab Number:** L1215735

Project Number: CANISTER QC BAT **Report Date:** 10/31/12

Air Canister Certification Results

Lab ID: L1215735-04 Date Collected: 09/04/12 09:11

Client ID: CAN 1648 SHELF 52 Date Received: 09/05/12

Sample Location: Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air - Mansfield Lab								
Trichloroethene	ND	0.200	--	ND	1.07	--		1
2,2,4-Trimethylpentane	ND	0.200	--	ND	0.934	--		1
Methyl Methacrylate	ND	0.500	--	ND	2.05	--		1
Heptane	ND	0.200	--	ND	0.820	--		1
cis-1,3-Dichloropropene	ND	0.200	--	ND	0.908	--		1
4-Methyl-2-pentanone	ND	0.200	--	ND	0.820	--		1
trans-1,3-Dichloropropene	ND	0.200	--	ND	0.908	--		1
1,1,2-Trichloroethane	ND	0.200	--	ND	1.09	--		1
Toluene	ND	0.200	--	ND	0.754	--		1
1,3-Dichloropropane	ND	0.200	--	ND	0.924	--		1
2-Hexanone	ND	0.200	--	ND	0.820	--		1
Dibromochloromethane	ND	0.200	--	ND	1.70	--		1
1,2-Dibromoethane	ND	0.200	--	ND	1.54	--		1
Butyl acetate	ND	0.500	--	ND	2.38	--		1
Octane	ND	0.200	--	ND	0.934	--		1
Tetrachloroethene	ND	0.200	--	ND	1.36	--		1
1,1,1,2-Tetrachloroethane	ND	0.200	--	ND	1.37	--		1
Chlorobenzene	ND	0.200	--	ND	0.921	--		1
Ethylbenzene	ND	0.200	--	ND	0.869	--		1
p/m-Xylene	ND	0.400	--	ND	1.74	--		1
Bromoform	ND	0.200	--	ND	2.07	--		1
Styrene	ND	0.200	--	ND	0.852	--		1
1,1,2,2-Tetrachloroethane	ND	0.200	--	ND	1.37	--		1
o-Xylene	ND	0.200	--	ND	0.869	--		1
1,2,3-Trichloropropane	ND	0.200	--	ND	1.20	--		1
Nonane	ND	0.200	--	ND	1.05	--		1
Isopropylbenzene	ND	0.200	--	ND	0.983	--		1
Bromobenzene	ND	0.200	--	ND	0.793	--		1

Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT
Lab Number: L1215735
Report Date: 10/31/12

Air Canister Certification Results

Lab ID: L1215735-04
Client ID: CAN 1648 SHELF 52
Sample Location:
Date Collected: 09/04/12 09:11
Date Received: 09/05/12
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air - Mansfield Lab								
2-Chlorotoluene	ND	0.200	--	ND	1.04	--		1
n-Propylbenzene	ND	0.200	--	ND	0.983	--		1
4-Chlorotoluene	ND	0.200	--	ND	1.04	--		1
4-Ethyltoluene	ND	0.200	--	ND	0.983	--		1
1,3,5-Trimethybenzene	ND	0.200	--	ND	0.983	--		1
tert-Butylbenzene	ND	0.200	--	ND	1.10	--		1
1,2,4-Trimethylbenzene	ND	0.200	--	ND	0.983	--		1
Decane	ND	0.200	--	ND	1.16	--		1
Benzyl chloride	ND	0.200	--	ND	1.04	--		1
1,3-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
1,4-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
sec-Butylbenzene	ND	0.200	--	ND	1.10	--		1
p-Isopropyltoluene	ND	0.200	--	ND	1.10	--		1
1,2-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
n-Butylbenzene	ND	0.200	--	ND	1.10	--		1
1,2-Dibromo-3-chloropropane	ND	0.200	--	ND	1.93	--		1
Undecane	ND	0.200	--	ND	1.28	--		1
Dodecane	ND	0.200	--	ND	1.39	--		1
1,2,4-Trichlorobenzene	ND	0.200	--	ND	1.48	--		1
Naphthalene	ND	0.200	--	ND	1.05	--		1
1,2,3-Trichlorobenzene	ND	0.200	--	ND	1.48	--		1
Hexachlorobutadiene	ND	0.200	--	ND	2.13	--		1

	Results	**Qualifier**	**Units**	**RDL**	**Dilution Factor**
Tentatively Identified Compounds					
No Tentatively Identified Compounds					

Project Name: BATCH CANISTER CERTIFICATION **Lab Number:** L1215735

Project Number: CANISTER QC BAT **Report Date:** 10/31/12

Air Canister Certification Results

Lab ID: L1215735-04 Date Collected: 09/04/12 09:11

Client ID: CAN 1648 SHELF 52 Date Received: 09/05/12

Sample Location: Field Prep: Not Specified

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air - Mansfield Lab								

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-Difluorobenzene	105		60-140
Bromochloromethane	104		60-140
chlorobenzene-d5	97		60-140

Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT
Lab Number: L1215735
Report Date: 10/31/12

Air Canister Certification Results

Lab ID: L1215735-04
Client ID: CAN 1648 SHELF 52
Sample Location:
Matrix: Air
Anaytical Method: 48,TO-15-SIM
Analytical Date: 09/05/12 18:00
Analyst: MB

Date Collected: 09/04/12 09:11
Date Received: 09/05/12
Field Prep: Not Specified

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air by SIM - Mansfield Lab								
Dichlorodifluoromethane	ND	0.050	--	ND	0.247	--		1
Chloromethane	ND	0.500	--	ND	1.03	--		1
Freon-114	ND	0.050	--	ND	0.349	--		1
Vinyl chloride	ND	0.020	--	ND	0.051	--		1
1,3-Butadiene	ND	0.020	--	ND	0.044	--		1
Bromomethane	ND	0.020	--	ND	0.078	--		1
Chloroethane	ND	0.020	--	ND	0.053	--		1
Acetone	ND	2.00	--	ND	4.75	--		1
Trichlorofluoromethane	ND	0.050	--	ND	0.281	--		1
Acrylonitrile	ND	0.500	--	ND	1.08	--		1
1,1-Dichloroethene	ND	0.020	--	ND	0.079	--		1
Methylene chloride	ND	1.00	--	ND	3.47	--		1
Freon-113	ND	0.050	--	ND	0.383	--		1
Halothane	ND	0.050	--	ND	0.404	--		1
trans-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
1,1-Dichloroethane	ND	0.020	--	ND	0.081	--		1
Methyl tert butyl ether	ND	0.020	--	ND	0.072	--		1
2-Butanone	ND	0.500	--	ND	1.47	--		1
cis-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
Chloroform	ND	0.020	--	ND	0.098	--		1
1,2-Dichloroethane	ND	0.020	--	ND	0.081	--		1
1,1,1-Trichloroethane	ND	0.020	--	ND	0.109	--		1
Benzene	ND	0.100	--	ND	0.319	--		1
Carbon tetrachloride	ND	0.020	--	ND	0.126	--		1
1,2-Dichloropropane	ND	0.020	--	ND	0.092	--		1

Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT
Lab Number: L1215735
Report Date: 10/31/12

Air Canister Certification Results

Lab ID: L1215735-04
Client ID: CAN 1648 SHELF 52
Sample Location:
Date Collected: 09/04/12 09:11
Date Received: 09/05/12
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air by SIM - Mansfield Lab								
Bromodichloromethane	ND	0.020	--	ND	0.134	--		1
Trichloroethene	ND	0.020	--	ND	0.107	--		1
1,4-Dioxane	ND	0.100	--	ND	0.360	--		1
cis-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
4-Methyl-2-pentanone	ND	0.500	--	ND	2.05	--		1
trans-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
1,1,2-Trichloroethane	ND	0.020	--	ND	0.109	--		1
Toluene	ND	0.050	--	ND	0.188	--		1
Dibromochloromethane	ND	0.020	--	ND	0.170	--		1
1,2-Dibromoethane	ND	0.020	--	ND	0.154	--		1
Tetrachloroethene	ND	0.020	--	ND	0.136	--		1
1,1,1,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
Chlorobenzene	ND	0.020	--	ND	0.092	--		1
Ethylbenzene	ND	0.020	--	ND	0.087	--		1
p/m-Xylene	ND	0.040	--	ND	0.174	--		1
Bromoform	ND	0.020	--	ND	0.207	--		1
Styrene	ND	0.020	--	ND	0.085	--		1
1,1,2,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
o-Xylene	ND	0.020	--	ND	0.087	--		1
Isopropylbenzene	ND	0.500	--	ND	2.46	--		1
1,3,5-Trimethybenzene	ND	0.020	--	ND	0.098	--		1
1,2,4-Trimethylbenzene	ND	0.020	--	ND	0.098	--		1
1,3-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,4-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
sec-Butylbenzene	ND	0.500	--	ND	2.74	--		1
p-Isopropyltoluene	ND	0.500	--	ND	2.74	--		1
1,2-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
n-Butylbenzene	ND	0.500	--	ND	2.74	--		1

Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT

Lab Number: L1215735
Report Date: 10/31/12

Air Canister Certification Results

Lab ID: L1215735-04
Client ID: CAN 1648 SHELF 52
Sample Location:

Date Collected: 09/04/12 09:11
Date Received: 09/05/12
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air by SIM - Mansfield Lab								
1,2,4-Trichlorobenzene	ND	0.050	--	ND	0.371	--		1
Naphthalene	ND	0.050	--	ND	0.262	--		1
1,2,3-Trichlorobenzene	ND	0.050	--	ND	0.371	--		1
Hexachlorobutadiene	ND	0.050	--	ND	0.533	--		1

Internal Standard	**% Recovery**	**Qualifier**	**Acceptance Criteria**
1,4-difluorobenzene	96		60-140
bromochloromethane	95		60-140
chlorobenzene-d5	100		60-140

AIR Petro Can Certification

Project Name: BATCH CANISTER CERTIFICATION **Lab Number:** L1215735

Project Number: CANISTER QC BAT **Report Date:** 10/31/12

AIR CAN CERTIFICATION RESULTS

Lab ID:	L1215735-03	Date Collected:	09/04/12 08:57
Client ID:	CAN 1632 SHELF 46	Date Received:	09/05/12
Sample Location:	Not Specified	Field Prep:	Not Specified
Matrix:	Air		
Analytical Method:	96,APH		
Analytical Date:	09/06/12 21:10		
Analyst:	MB		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Petroleum Hydrocarbons in Air - Mansfield Lab						
1,3-Butadiene	ND		ug/m3	2.0	--	1
Methyl tert butyl ether	ND		ug/m3	2.0	--	1
Benzene	ND		ug/m3	2.0	--	1
Toluene	ND		ug/m3	2.0	--	1
C5-C8 Aliphatics, Adjusted	ND		ug/m3	12	--	1
Ethylbenzene	ND		ug/m3	2.0	--	1
p/m-Xylene	ND		ug/m3	4.0	--	1
o-Xylene	ND		ug/m3	2.0	--	1
Naphthalene	ND		ug/m3	2.0	--	1
C9-C12 Aliphatics, Adjusted	ND		ug/m3	14	--	1
C9-C10 Aromatics Total	ND		ug/m3	10	--	1

Project Name: BATCH CANISTER CERTIFICATION **Lab Number:** L1215735

Project Number: CANISTER QC BAT **Report Date:** 10/31/12

AIR CAN CERTIFICATION RESULTS

Lab ID:	L1215735-04	Date Collected:	09/04/12 09:11
Client ID:	CAN 1648 SHELF 52	Date Received:	09/05/12
Sample Location:	Not Specified	Field Prep:	Not Specified
Matrix:	Air		
Analytical Method:	96,APH		
Analytical Date:	09/06/12 21:41		
Analyst:	MB		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Petroleum Hydrocarbons in Air - Mansfield Lab						
1,3-Butadiene	ND		ug/m3	2.0	--	1
Methyl tert butyl ether	ND		ug/m3	2.0	--	1
Benzene	ND		ug/m3	2.0	--	1
Toluene	ND		ug/m3	2.0	--	1
C5-C8 Aliphatics, Adjusted	ND		ug/m3	12	--	1
Ethylbenzene	ND		ug/m3	2.0	--	1
p/m-Xylene	ND		ug/m3	4.0	--	1
o-Xylene	ND		ug/m3	2.0	--	1
Naphthalene	ND		ug/m3	2.0	--	1
C9-C12 Aliphatics, Adjusted	ND		ug/m3	14	--	1
C9-C10 Aromatics Total	ND		ug/m3	10	--	1

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201

Lab Number: L1217119
Report Date: 10/31/12

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Reagent H2O Preserved Vials Frozen on: NA

Cooler Information **Custody Seal**
Cooler
N/A Absent

Container Information

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1217119-01A	Canister - 6 Liter	N/A	N/A		Y	Absent	MCP-TO15-SIM(30),APH-10(30),MCP-TO15(30)
L1217119-02A	Canister - 6 Liter	N/A	N/A		Y	Absent	MCP-TO15-SIM(30),APH-10(30),MCP-TO15(30)
L1217119-03A	Canister - 6 Liter	N/A	N/A		Y	Absent	MCP-TO15-SIM(30),APH-10(30),MCP-TO15(30)
L1217119-04A	Canister - 6 Liter	N/A	N/A		Y	Absent	MCP-TO15-SIM(30),APH-10(30),MCP-TO15(30)
L1217119-05A	Canister - 6 Liter	N/A	N/A		Y	Absent	MCP-TO15-SIM(30),APH-10(30),MCP-TO15(30)
L1217119-06A	Canister - 6 Liter	N/A	N/A		Y	Absent	MCP-TO15-SIM(30),APH-10(30),MCP-TO15(30)

*Values in parentheses indicate holding time in days

Project Name:	CUMMINGS BEVERLY AIR SAMPLING	**Lab Number:**	L1217119
Project Number:	12201	**Report Date:**	10/31/12

GLOSSARY

Acronyms

EPA	- Environmental Protection Agency.
LCS	- Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
LCSD	- Laboratory Control Sample Duplicate: Refer to LCS.
LFB	- Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.
MDL	- Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
MS	- Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.
MSD	- Matrix Spike Sample Duplicate: Refer to MS.
NA	- Not Applicable.
NC	- Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.
NI	- Not Ignitable.
RL	- Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.
RPD	- Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.
SRM	- Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.

Footnotes

1	- The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Data Qualifiers

A	- Spectra identified as "Aldol Condensation Product".
B	- The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than five times (5x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit.
C	- Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.
D	- Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.
E	- Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.
G	- The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.
H	- The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.
I	- The RPD between the results for the two columns exceeds the method-specified criteria; however, the lower value has been reported due to obvious interference.
M	- Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.
NJ	- Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

Report Format: Data Usability Report

Project Name:	CUMMINGS BEVERLY AIR SAMPLING	**Lab Number:**	L1217119
Project Number:	12201	**Report Date:**	10/31/12

Data Qualifiers

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

J - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

ND - Not detected at the reporting limit (RL) for the sample.

Report Format: Data Usability Report

Project Name:	CUMMINGS BEVERLY AIR SAMPLING	**Lab Number:**	L1217119
Project Number:	12201	**Report Date:**	10/31/12

REFERENCES

96 Method for the Determination of Air-Phase Petroleum Hydrocarbons (APH), MassDEP, December 2009, Revision 1 with QC Requirements & Performance Standards for the Analysis of APH by GC/MS under the Massachusetts Contingency Plan, WSC-CAM-IXA, July 2010.

101 Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air (EPA/625/R-96/010b:January 1999) with QC Requirements & Performance Standards for the Analysis of TO-15 under the Massachusetts Contingency Plan, WSC-CAM-IXB, July 2010.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certificate/Approval Program Summary

Last revised August 3, 2012 – Mansfield Facility

The following list includes only those analytes/methods for which certification/approval is currently held.
For a complete listing of analytes for the referenced methods, please contact your Alpha Customer Service Representative.

Connecticut Department of Public Health Certificate/Lab ID: PH-0141.

Wastewater/Non-Potable Water (Inorganic Parameters: pH, Turbidity, Conductivity, Alkalinity, Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Potassium, Selenium, Silver, Sodium, Strontium, Thallium, Tin, Titanium, Vanadium, Zinc, Total Residue (Solids), Total Suspended Solids (non-filterable). Organic Parameters: PCBs, Organochlorine Pesticides, Technical Chlordane, Toxaphene, Acid Extractables, Benzidines, Phthalate Esters, Nitrosamines, Nitroaromatics & Isophorone, PAHs, Haloethers, Chlorinated Hydrocarbons, Volatile Organics.)

Solid Waste/Soil (Inorganic Parameters: pH, Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Hexavalent Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Titanium, Vanadium, Zinc, Total Organic Carbon, Corrosivity, TCLP 1311, SPLP 1312. Organic Parameters: PCBs, Organochlorine Pesticides, Technical Chlordane, Toxaphene, Volatile Organics, Acid Extractables, Benzidines, Phthalates, Nitrosamines, Nitroaromatics & Cyclic Ketones, PAHs, Haloethers, Chlorinated Hydrocarbons.)

Florida Department of Health Certificate/Lab ID: E87814. ***NELAP Accredited.***

Non-Potable Water (Inorganic Parameters: SM2320B, SM2540D, SM2540G.)

Solid & Chemical Materials (Inorganic Parameters: 6020, 7470, 7471, 9045. Organic Parameters: EPA 8260, 8270, 8082, 8081.)

Air & Emissions (EPA TO-15.)

Louisiana Department of Environmental Quality Certificate/Lab ID: 03090. ***NELAP Accredited.***

Non-Potable Water (Inorganic Parameters: EPA 180.1, 245.7, 1631E, 3020A, 6020A, 7470A, 9040, 9050A, SM2320B, 2540D, 2540G, 4500H-B, Organic Parameters: EPA 3510C, 3580A, 3630C, 3640A, 3660B, 3665A, 5030B, 8015D, 3570, 8081B, 8082A, 8260B, 8270C, 8270D.)

Solid & Chemical Materials (Inorganic Parameters: EPA 1311, 3050B, 3051A, 3060A, 6020A, 7196A, 7470A, 7471B, 7474, 9040B, 9045C, 9060. Organic Parameters: EPA 3540C, 3570, 3580A, 3630C, 3640A, 3660, 3665A, 5035, 8015D, 8081B, 8082A, 8260B, 8270C, 8270D.)

Biological Tissue (Inorganic Parameters: EPA 6020A. Organic Parameters: EPA 3570, 3510C, 3610B, 3630C, 3640A, 8270C, 8270D.)

Air & Emissions (EPA TO-15.)

New Hampshire Department of Environmental Services Certificate/Lab ID: 2206. ***NELAP Accredited.***

Non-Potable Water (Inorganic Parameters: EPA 180.1, 1631E, 6020A, 7470A, 9040B, 9050A, SM2540D, 2540G, 4500H+B, 2320B, 3020A, . Organic Parameters: EPA 3510C, 3630C, 3640A, 3660B, 8081B, 8082A, 8270C, 8270D, 8015D.)

Solid & Chemical Materials (Inorganic Parameters: SW-846 1311, 3050B, 3051A, 6020A, 7471B, 9040B, 9045C. Organic Parameters: SW-846 3540C, 3580A, 3630C, 3640A, 3660B, 3665A, 8270C, 8015D, 8082A, 8081B.)

New Jersey Department of Environmental Protection Certificate/Lab ID: MA015. ***NELAP Accredited.***

Non-Potable Water (Inorganic Parameters: SW-846 1312, 3020A, SM2320B, SM2540D, 2540G, 4500H-B, EPA 180.1, 1631E, SW-846 7470A, 9040C, 6020A, 9050A. Organic Parameters: SW-846 3510C, 3580A, 3630C, 3640A, 3660B, 3665A, 8015D, 8081B, 8082A, 8270C, 8270D)

Solid & Chemical Materials (Inorganic Parameters: SW-846 1311, 1312, 3050B, 3051A, 6020A, 7471B, 7474, 9040B, 9040C, 9045C, 9045D, 9060. Organic Parameters: SW-846 3540C, 3570, 3580A, 3630C, 3640A, 3660B, 3665A, 8081B, 8082A, 8270C, 8270D, 8015D.)

Atmospheric Organic Parameters (EPA 3C, TO-15, TO-10A, TO-13A-SIM.)

Biological Tissue (Inorganic Parameters: SW-846 6020A. Organic Parameters: SW-846 8270C, 8270D, 3510C, 3570, 3610C, 3630C, 3640A)

New York Department of Health Certificate/Lab ID: 11627. ***NELAP Accredited.***

Non-Potable Water (Inorganic Parameters: SM2320B, SM2540D, 6020A, 1631E, 7470A, 9050A, EPA 180.1, 3020A. Organic Parameters: EPA 8270C, 8270D, 8081B, 8082A, 3510C.)

Solid & Hazardous Waste (Inorganic Parameters: EPA 6020A, 7471B, 7474, 9040C, 9045D. Organic Parameters: EPA 8270C, 8270D, 8081B, 8082A, 1311, 3050B, 3580A, 3570, 3051A.)

Air & Emissions (EPA TO-15, TO-10A.)

Pennsylvania Certificate/Lab ID: 68-02089 ***NELAP Accredited***

Non-Potable Water (Inorganic Parameters: 1312, 1631E, 180.1, 3020A, 6020A, 7470A, 9040B, 9050A, 2320B, 2540D, 2540G, SM4500H+-B. Organic Parameters: 3510C, 3580A, 3630C, 3640A, 3660B, 3665A, 8015D, 8081B, 8082A, 8270C, 8270D .)

Solid & Hazardous Waste (Inorganic Parameters: EPA 1311, 3051A, 6020A, 7471B, 7474 9040B, 9045C, 9060. Organic Parameters: EPA3050B, 3540C, 3570, 3580A, 3630C, 3640A, 3660B, 3665A, 8270C, 8270D, 8081B, 8015D, 8082A.)

Rhode Island Department of Health Certificate/Lab ID: LAO00299. ***NELAP Accredited via NJ-DEP.***

Refer to NJ-DEP Certificate for Non-Potable Water.

Texas Commission of Environmental Quality Certificate/Lab ID: T104704419-08-TX. ***NELAP Accredited.***

Solid & Chemical Materials (Inorganic Parameters: EPA 6020, 7470, 7471, 1311, 9040, 9045, 9060. Organic Parameters: EPA 8015, 8270, 8081, 8082.)

Air (Organic Parameters: EPA TO-15)

Virginia Division of Consolidated Laboratory Services Certificate/Lab ID:460194. ***NELAP Accredited.***

Non-Potable Water (Inorganic Parameters:EPA 3020A, 6020A, 245.7, 9040B. Organic Parameters: EPA 3510C, 3640A, 3660B, 3665A, 8270C, 8270D, 8082A, 8081B, 8015D.)

Solid & Chemical Materials (Inorganic Parameters: EPA 6020A,7470A,7471B,9040B,9045C,3050B,3051, 9060. Organic Parameters: EPA 3540C, 3580A, 3630C, 3640A, 3660B, 3665A, 3570, 8270C, 8270D, 8081B, 8082A, 8015D.)

Washington State Department of Ecology Certificate/Lab ID: C954. *Non-Potable Water* (Inorganic Parameters: SM2540D, 180.1, 1631E.)

Solid & Chemical Materials (Inorganic Parameters: EPA 6020, 7470, 7471, 7474, 9045C, 9050A, 9060. Organic Parameters: EPA 8081, 8082, 8015, 8270.)

U.S. Army Corps of Engineers

Department of Defense, L-A-B Certificate/Lab ID: L2217.01.

Non-Potable Water (Inorganic Parameters: EPA 6020A, SM4500H-B. Organic Parameters: 3020A, 3510C, 8270C, 8270D, 8270C-ALK-PAH, 8270D-ALK-PAH, 8082A, 8081B, 8015D-SHC, 8015D.)

Solid & Hazardous Waste (Inorganic Parameters: EPA 1311, 3050B, 6020A, 7471A, 9045C, 9060, SM 2540G, ASTM D422-63. Organic Parameters: EPA 3580A, 3570, 3540C, 8270C, 8270D, 8270C-ALK-PAH, 8270D-ALK-PAH 8082A, 8081B, 8015D-SHC, 8015D.

Air & Emissions (EPA TO-15.)

Analytes Not Accredited by NELAP

Certification is not available by NELAP for the following analytes: **8270C:** Biphenyl. **TO-15:** Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 2-Methylnaphthalene, 1-Methylnaphthalene.

AIR ANALYSIS

PAGE 1 OF 1

CHAIN OF CUSTODY

320 Forbes Blvd, Mansfield, MA 02048
TEL: 508-822-9300 FAX: 508-822-3288

Date Rec'd in Lab:

ALPHA Job #: L1217119

Client Information

Client: Geosphere Environmental Mgmt. Inc
Address: 51 Portsmouth Ave
Exeter, NH 03833
Phone: 603-773-0075 x14
Fax: 603-773-0077
Email: bhoskins@geospherenh.com
☐ These samples have been previously analyzed by Alpha

Project Information

Project Name: Cummings Beverly Air Sampling
Project Location: Beverly, MA
Project #: 12201
Project Manager: Bruce Hoskins
ALPHA Quote #:

Turn-Around Time

☒ Standard ☐ RUSH *(only confirmed if pre-approved!)*
Date Due: Time:

Report Information - Data Deliverables

☐ FAX
☐ ADEx
Criteria Checker:
(Default based on Regulatory Criteria Indicated)
Other Formats:
☒ EMAIL (standard pdf report)
☒ Additional Deliverables: Hard copy in mail
Report to: (if different than Project Manager)

Billing Information

☒ Same as Client info PO #:

Regulatory Requirements/Report Limits

State/Fed	Program	Criteria

Other Project Specific Requirements/Comments:

S/M analysis required to achieve lowest possible detection limits

All Columns Below Must Be Filled Out

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Start Time	End Time	Initial Vacuum	Final Vacuum	Sample Matrix*	Sampler's Initials	Can Size	I D Can	I D - Flow Controller	TO-14A by TO-15	TO-15	TO-15 SIM	APH	FIXED GASES	TO-13A	TO-4 / TO-10	Sample Comments (i.e. PID)
-1	S-149-J	9/21/12	4:25pm	4:25pm	-30.25	-7.96	AA	CW	6L	1531	0264			X	X				
-2	DUP		4:30pm	4:30pm	-30.50	-7.88	AA	CW	6L	934	0131			X	X				
-3	S-157-J		4:44pm	4:44pm	-30.67	-9.95	AA	CW	6L	1640	0330			X	X				
-4	S-1100		5:00pm	5:00pm	-30.32	-10.72	AA	CW	6L	943	0194			X	X				
-5	S-171-X		5:07pm	5:07pm	-30.04	-7.66	AA	CW	6L	1632	0500			X	X				
-6	NEPD		5:18pm	5:18pm	-29.16	-4.73	AA	CW	6L	1629	0145			X	X				

ANALYSIS

*SAMPLE MATRIX CODES

AA = Ambient Air (Indoor/Outdoor)
SV = Soil Vapor/Landfill Gas/SVE
Other = Please Specify

Container Type: C5 C5

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

Relinquished By:	Date/Time	Received By:	Date/Time:
[signature]	9/24/12 1250	[signature]	9/24/12 1250
[signature]	9/24/12 1750	Pat Cole	9/24/12 1750
Pat Cole	9/25/12 815	[signature]	9/25/12 0815

ANALYTICAL REPORT

Lab Number:	L1302224
Client:	Geosphere Environmental Mgmt, Inc 51 Portsmouth Avenue Exeter, NH 03833
ATTN:	Bruce Hoskins
Phone:	(603) 773-0075
Project Name:	CUMMINGS BEVERLY AIR SAMPLING
Project Number:	12201
Report Date:	02/15/13

Certifications & Approvals: NY (11627), CT (PH-0141), NH (2206), NJ NELAP (MA015), RI (LAO00299), PA (68-02089), LA NELAP (03090), FL (E87814), TX (T104704419), WA (C954), DOD (L2217.01), USDA (Permit #P330-11-00109), US Army Corps of Engineers.

320 Forbes Boulevard, Mansfield, MA 02048-1806
508-822-9300 (Fax) 508-822-3288 800-624-9220 - www.alphalab.com

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201

Lab Number: L1302224
Report Date: 02/15/13

Alpha Sample ID	Client ID	Sample Location	Collection Date/Time
L1302224-01	S-149-J	BEVERLY, MA	02/04/13 15:05
L1302224-02	DUP	BEVERLY, MA	02/04/13 15:07
L1302224-03	S-157-J	BEVERLY, MA	02/04/13 15:14
L1302224-04	S-1100	BEVERLY, MA	02/04/13 15:40
L1302224-05	S-171-X	BEVERLY, MA	02/04/13 15:30
L1302224-06	NEPD	BEVERLY, MA	02/04/13 15:20

Project Name: CUMMINGS BEVERLY AIR SAMPLING **Lab Number:** L1302224

Project Number: 12201 **Report Date:** 02/15/13

MADEP MCP Response Action Analytical Report Certification

This form provides certifications for all samples performed by MCP methods. Please refer to the Sample Results and Container Information sections of this report for specification of MCP methods used for each analysis. The following questions pertain only to MCP Analytical Methods.

An affirmative response to questions A through F is required for "Presumptive Certainty" status		
A	Were all samples received in a condition consistent with those described on the Chain-of-Custody, properly preserved (including temperature) in the field or laboratory, and prepared/analyzed within method holding times?	YES
B	Were the analytical method(s) and all associated QC requirements specified in the selected CAM protocol(s) followed?	YES
C	Were all required corrective actions and analytical response actions specified in the selected CAM protocol(s) implemented for all identified performance standard non-conformances?	YES
D	Does the laboratory report comply with all the reporting requirements specified in CAM VII A, "Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data?"	YES
E a.	VPH, EPH, and APH Methods only: Was each method conducted without significant modification(s)? (Refer to the individual method(s) for a list of significant modifications).	YES
E b.	APH and TO-15 Methods only: Was the complete analyte list reported for each method?	YES
F	Were all applicable CAM protocol QC and performance standard non-conformances identified and evaluated in a laboratory narrative (including all "No" responses to Questions A through E)?	YES

A response to questions G, H and I is required for "Presumptive Certainty" status		
G	Were the reporting limits at or below all CAM reporting limits specified in the selected CAM protocol(s)?	NO
H	Were all QC performance standards specified in the CAM protocol(s) achieved?	YES
I	Were results reported for the complete analyte list specified in the selected CAM protocol(s)?	YES

For any questions answered "No", please refer to the case narrative section on the following page(s).

Please note that sample matrix information is located in the Sample Results section of this report.

Project Name: CUMMINGS BEVERLY AIR SAMPLING **Lab Number:** L1302224
Project Number: 12201 **Report Date:** 02/15/13

Case Narrative

The samples were received in accordance with the Chain of Custody and no significant deviations were encountered during the preparation or analysis unless otherwise noted. Sample Receipt, Container Information, and the Chain of Custody are located at the back of the report.

Results contained within this report relate only to the samples submitted under this Alpha Lab Number and meet all of the requirements of NELAC, for all NELAC accredited parameters. The data presented in this report is organized by parameter (i.e. VOC, SVOC, etc.). Sample specific Quality Control data (i.e. Surrogate Spike Recovery) is reported at the end of the target analyte list for each individual sample, followed by the Laboratory Batch Quality Control at the end of each parameter. If a sample was re-analyzed or re-extracted due to a required quality control corrective action and if both sets of data are reported, the Laboratory ID of the re-analysis or re-extraction is designated with an "R" or "RE", respectively. When multiple Batch Quality Control elements are reported (e.g. more than one LCS), the associated samples for each element are noted in the grey shaded header line of each data table. Any Laboratory Batch, Sample Specific % recovery or RPD value that is outside the listed Acceptance Criteria is bolded in the report. Performance criteria for CAM and RCP methods allow for some LCS compound failures to occur and still be within method compliance. In these instances, the specific failures are not narrated but are noted in the associated QC table. This information is also incorporated in the Data Usability format for our Data Merger tool where it can be reviewed along with any associated usability implications. Soil/sediments, solids and tissues are reported on a dry weight basis unless otherwise noted. Definitions of all data qualifiers and acronyms used in this report are provided in the Glossary located at the back of the report.

In reference to questions H (CAM) or 4 (RCP) when "NO" is checked, the performance criteria for CAM and RCP methods allow for some quality control failures to occur and still be within method compliance. In these instances the specific failure is not narrated but noted in the associated QC table. The information is also incorporated in the Data Usability format of our Data Merger tool where it can be reviewed along with any associated usability implications.

Please see the associated ADEx data file for a comparison of laboratory reporting limits that were achieved with the regulatory Numerical Standards requested on the Chain of Custody.

HOLD POLICY
For samples submitted on hold, Alpha's policy is to hold samples free of charge for 30 days from the date the project is completed. After 30 days, we will dispose of all samples submitted including those put on hold unless you have contacted your Client Service Representative and made arrangements for Alpha to continue to hold the samples.

Please contact Client Services at 800-624-9220 with any questions.

Project Name:	CUMMINGS BEVERLY AIR SAMPLING	**Lab Number:**	L1302224
Project Number:	12201	**Report Date:**	02/15/13

Case Narrative (continued)

REISSUE

Report Submission

This report replaces the report issued February 13, 2013. The report has been revised to include additional target compounds omitted from the original submittal.

MCP Related Narratives

Canisters were released from the laboratory on February 1, 2013. The canister certification data is provided as an addendum.

MCP Volatile Organics in Air

In reference to question G:

One or more of the target analytes did not achieve the requested CAM reporting limits.

TO-15

L1302224-03 was re-analyzed on dilution in order to quantitate the sample within the calibration range. The result should be considered estimated, and is qualified with an E flag, for any compound that exceeded the calibration on the initial analysis. The re-analysis was performed only for the compound that exceeded the calibration range.

TO15-SIM

L1302224-04 results for Chloromethane should be considered estimated due to co-elution with a non-target peak.

Petroleum Hydrocarbons in Air

In reference to question G:

One or more of the target analytes did not achieve the requested CAM reporting limits.

L1302224-01 through -06 All significant concentrations of non-petroleum VOCs detected in the TO-15

Project Name:	CUMMINGS BEVERLY AIR SAMPLING	**Lab Number:**	L1302224
Project Number:	12201	**Report Date:**	02/15/13

Case Narrative (continued)

analysis were subtracted from the corresponding hydrocarbon ranges.

I, the undersigned, attest under the pains and penalties of perjury that, to the best of my knowledge and belief and based upon my personal inquiry of those responsible for providing the information contained in this analytical report, such information is accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized Signature: Christopher J. Anderson

Title: Technical Director/Representative Date: 02/15/13

AIR

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1302224
Report Date: 02/15/13

SAMPLE RESULTS

Lab ID: L1302224-01
Client ID: S-149-J
Sample Location: BEVERLY, MA
Matrix: Air
Anaytical Method: 101,TO-15
Analytical Date: 02/08/13 18:56
Analyst: RY

Date Collected: 02/04/13 15:05
Date Received: 02/06/13
Field Prep: Not Specified

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
MCP Volatile Organics in Air - Mansfield Lab								
Propylene	ND	0.500	--	ND	0.861	--		1
Ethanol	141	2.50	--	266	4.71	--		1
Vinyl bromide	ND	0.200	--	ND	0.874	--		1
Acetone	9.44	1.00	--	22.4	2.38	--		1
Isopropanol	55.9	0.500	--	137	1.23	--		1
3-Chloropropene	ND	0.200	--	ND	0.626	--		1
Carbon disulfide	ND	0.200	--	ND	0.623	--		1
Vinyl acetate	ND	0.200	--	ND	0.704	--		1
2-Butanone	0.364	0.200	--	1.07	0.590	--		1
Ethyl Acetate	ND	0.500	--	ND	1.80	--		1
Tetrahydrofuran	ND	0.200	--	ND	0.590	--		1
n-Hexane	0.231	0.200	--	0.814	0.705	--		1
Cyclohexane	ND	0.200	--	ND	0.688	--		1
1,4-Dioxane	ND	0.200	--	ND	0.721	--		1
2,2,4-Trimethylpentane	ND	0.200	--	ND	0.934	--		1
Heptane	ND	0.200	--	ND	0.820	--		1
4-Methyl-2-pentanone	ND	0.200	--	ND	0.820	--		1
2-Hexanone	ND	0.200	--	ND	0.820	--		1
4-Ethyltoluene	ND	0.200	--	ND	0.983	--		1
Benzyl chloride	ND	0.200	--	ND	1.04	--		1

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1302224
Report Date: 02/15/13

SAMPLE RESULTS

Lab ID: L1302224-01
Client ID: S-149-J
Sample Location: BEVERLY, MA
Date Collected: 02/04/13 15:05
Date Received: 02/06/13
Field Prep: Not Specified

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
MCP Volatile Organics in Air - Mansfield Lab								

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-Difluorobenzene	84		60-140
Bromochloromethane	89		60-140
chlorobenzene-d5	89		60-140

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1302224
Report Date: 02/15/13

SAMPLE RESULTS

Lab ID: L1302224-01
Client ID: S-149-J
Sample Location: BEVERLY, MA
Matrix: Air
Anaytical Method: 101,TO15-SIM
Analytical Date: 02/08/13 18:56
Analyst: RY

Date Collected: 02/04/13 15:05
Date Received: 02/06/13
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
MCP Volatile Organics in Air by SIM - Mansfield Lab								
1,1,1-Trichloroethane	0.038	0.020	--	0.207	0.109	--		1
1,1,1,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
1,1,2,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
1,1,2-Trichloroethane	ND	0.020	--	ND	0.109	--		1
1,1-Dichloroethane	ND	0.020	--	ND	0.081	--		1
1,1-Dichloroethene	ND	0.020	--	ND	0.079	--		1
1,2,4-Trichlorobenzene	ND	0.050	--	ND	0.371	--		1
1,2,4-Trimethylbenzene	0.117	0.020	--	0.575	0.098	--		1
1,2-Dibromoethane	ND	0.020	--	ND	0.154	--		1
1,2-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,2-Dichloroethane	0.026	0.020	--	0.105	0.081	--		1
1,2-Dichloropropane	ND	0.020	--	ND	0.092	--		1
1,3,5-Trimethybenzene	0.035	0.020	--	0.172	0.098	--		1
1,3-Butadiene	ND	0.020	--	ND	0.044	--		1
1,3-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,4-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
Benzene	0.183	0.100	--	0.585	0.319	--		1
Bromodichloromethane	0.021	0.020	--	0.141	0.134	--		1
Bromoform	ND	0.020	--	ND	0.207	--		1
Bromomethane	ND	0.020	--	ND	0.078	--		1
Carbon tetrachloride	0.094	0.020	--	0.591	0.126	--		1
Chlorobenzene	ND	0.020	--	ND	0.092	--		1
Chloroethane	ND	0.020	--	ND	0.053	--		1
Chloroform	0.092	0.020	--	0.449	0.098	--		1

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1302224
Report Date: 02/15/13

SAMPLE RESULTS

Lab ID: L1302224-01
Client ID: S-149-J
Sample Location: BEVERLY, MA
Date Collected: 02/04/13 15:05
Date Received: 02/06/13
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	Results	RL	MDL	Results	RL	MDL	Qualifier	Dilution Factor
MCP Volatile Organics in Air by SIM - Mansfield Lab								
Chloromethane	ND	0.500	--	1.03	1.03	--		1
cis-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
cis-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
Dibromochloromethane	ND	0.020	--	ND	0.170	--		1
Dichlorodifluoromethane	0.475	0.050	--	2.35	0.247	--		1
Ethylbenzene	0.067	0.020	--	0.291	0.087	--		1
Freon-113	0.064	0.050	--	0.491	0.383	--		1
Freon-114	ND	0.050	--	ND	0.349	--		1
Hexachlorobutadiene	ND	0.050	--	ND	0.533	--		1
Methylene chloride	ND	1.40	--	ND	4.86	--		1
Methyl tert butyl ether	ND	0.020	--	ND	0.072	--		1
Naphthalene	ND	0.050	--	ND	0.262	--		1
p/m-Xylene	0.208	0.040	--	0.903	0.174	--		1
o-Xylene	0.091	0.020	--	0.395	0.087	--		1
Styrene	0.083	0.020	--	0.353	0.085	--		1
Tetrachloroethene	ND	0.020	--	ND	0.136	--		1
Toluene	0.290	0.050	--	1.09	0.188	--		1
trans-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
trans-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
Trichloroethene	ND	0.020	--	ND	0.107	--		1
Trichlorofluoromethane	0.221	0.050	--	1.24	0.281	--		1
Vinyl chloride	ND	0.020	--	ND	0.051	--		1

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-difluorobenzene	83		60-140
bromochloromethane	89		60-140
chlorobenzene-d5	89		60-140

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1302224
Report Date: 02/15/13

SAMPLE RESULTS

Lab ID: L1302224-02
Client ID: DUP
Sample Location: BEVERLY, MA
Matrix: Air
Anaytical Method: 101,TO-15
Analytical Date: 02/08/13 19:59
Analyst: RY

Date Collected: 02/04/13 15:07
Date Received: 02/06/13
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
MCP Volatile Organics in Air - Mansfield Lab								
Propylene	ND	0.500	--	ND	0.861	--		1
Ethanol	91.9	2.50	--	173	4.71	--		1
Vinyl bromide	ND	0.200	--	ND	0.874	--		1
Acetone	5.13	1.00	--	12.2	2.38	--		1
Isopropanol	21.9	0.500	--	53.8	1.23	--		1
3-Chloropropene	ND	0.200	--	ND	0.626	--		1
Carbon disulfide	ND	0.200	--	ND	0.623	--		1
Vinyl acetate	ND	0.200	--	ND	0.704	--		1
2-Butanone	ND	0.200	--	ND	0.590	--		1
Ethyl Acetate	ND	0.500	--	ND	1.80	--		1
Tetrahydrofuran	ND	0.200	--	ND	0.590	--		1
n-Hexane	0.209	0.200	--	0.737	0.705	--		1
Cyclohexane	ND	0.200	--	ND	0.688	--		1
1,4-Dioxane	ND	0.200	--	ND	0.721	--		1
2,2,4-Trimethylpentane	ND	0.200	--	ND	0.934	--		1
Heptane	ND	0.200	--	ND	0.820	--		1
4-Methyl-2-pentanone	ND	0.200	--	ND	0.820	--		1
2-Hexanone	ND	0.200	--	ND	0.820	--		1
4-Ethyltoluene	ND	0.200	--	ND	0.983	--		1
Benzyl chloride	ND	0.200	--	ND	1.04	--		1

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1302224
Report Date: 02/15/13

SAMPLE RESULTS

Lab ID: L1302224-02
Client ID: DUP
Sample Location: BEVERLY, MA
Date Collected: 02/04/13 15:07
Date Received: 02/06/13
Field Prep: Not Specified

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
MCP Volatile Organics in Air - Mansfield Lab								

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-Difluorobenzene	84		60-140
Bromochloromethane	89		60-140
chlorobenzene-d5	87		60-140

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1302224
Report Date: 02/15/13

SAMPLE RESULTS

Lab ID: L1302224-02
Client ID: DUP
Sample Location: BEVERLY, MA
Matrix: Air
Anaytical Method: 101,TO15-SIM
Analytical Date: 02/08/13 19:59
Analyst: RY

Date Collected: 02/04/13 15:07
Date Received: 02/06/13
Field Prep: Not Specified

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
MCP Volatile Organics in Air by SIM - Mansfield Lab								
1,1,1-Trichloroethane	0.036	0.020	--	0.196	0.109	--		1
1,1,1,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
1,1,2,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
1,1,2-Trichloroethane	ND	0.020	--	ND	0.109	--		1
1,1-Dichloroethane	ND	0.020	--	ND	0.081	--		1
1,1-Dichloroethene	ND	0.020	--	ND	0.079	--		1
1,2,4-Trichlorobenzene	ND	0.050	--	ND	0.371	--		1
1,2,4-Trimethylbenzene	0.025	0.020	--	0.123	0.098	--		1
1,2-Dibromoethane	ND	0.020	--	ND	0.154	--		1
1,2-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,2-Dichloroethane	0.023	0.020	--	0.093	0.081	--		1
1,2-Dichloropropane	ND	0.020	--	ND	0.092	--		1
1,3,5-Trimethybenzene	ND	0.020	--	ND	0.098	--		1
1,3-Butadiene	ND	0.020	--	ND	0.044	--		1
1,3-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,4-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
Benzene	0.161	0.100	--	0.514	0.319	--		1
Bromodichloromethane	ND	0.020	--	ND	0.134	--		1
Bromoform	ND	0.020	--	ND	0.207	--		1
Bromomethane	ND	0.020	--	ND	0.078	--		1
Carbon tetrachloride	0.089	0.020	--	0.560	0.126	--		1
Chlorobenzene	ND	0.020	--	ND	0.092	--		1
Chloroethane	ND	0.020	--	ND	0.053	--		1
Chloroform	0.086	0.020	--	0.420	0.098	--		1

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1302224
Report Date: 02/15/13

SAMPLE RESULTS

Lab ID: L1302224-02
Client ID: DUP
Sample Location: BEVERLY, MA
Date Collected: 02/04/13 15:07
Date Received: 02/06/13
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
MCP Volatile Organics in Air by SIM - Mansfield Lab								
Chloromethane	ND	0.500	--	ND	1.03	--		1
cis-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
cis-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
Dibromochloromethane	ND	0.020	--	ND	0.170	--		1
Dichlorodifluoromethane	0.455	0.050	--	2.25	0.247	--		1
Ethylbenzene	0.040	0.020	--	0.174	0.087	--		1
Freon-113	0.064	0.050	--	0.491	0.383	--		1
Freon-114	ND	0.050	--	ND	0.349	--		1
Hexachlorobutadiene	ND	0.050	--	ND	0.533	--		1
Methylene chloride	ND	1.40	--	ND	4.86	--		1
Methyl tert butyl ether	ND	0.020	--	ND	0.072	--		1
Naphthalene	ND	0.050	--	ND	0.262	--		1
p/m-Xylene	0.106	0.040	--	0.460	0.174	--		1
o-Xylene	0.046	0.020	--	0.200	0.087	--		1
Styrene	ND	0.020	--	ND	0.085	--		1
Tetrachloroethene	ND	0.020	--	ND	0.136	--		1
Toluene	0.222	0.050	--	0.837	0.188	--		1
trans-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
trans-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
Trichloroethene	ND	0.020	--	ND	0.107	--		1
Trichlorofluoromethane	0.218	0.050	--	1.23	0.281	--		1
Vinyl chloride	ND	0.020	--	ND	0.051	--		1

Internal Standard	**% Recovery**	**Qualifier**	**Acceptance Criteria**
1,4-difluorobenzene	84		60-140
bromochloromethane	90		60-140
chlorobenzene-d5	86		60-140

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1302224
Report Date: 02/15/13

SAMPLE RESULTS

Lab ID: L1302224-03
Client ID: S-157-J
Sample Location: BEVERLY, MA
Matrix: Air
Anaytical Method: 101,TO-15
Analytical Date: 02/08/13 20:31
Analyst: RY

Date Collected: 02/04/13 15:14
Date Received: 02/06/13
Field Prep: Not Specified

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
MCP Volatile Organics in Air - Mansfield Lab								
Propylene	ND	0.500	--	ND	0.861	--		1
Ethanol	61.2	2.50	--	115	4.71	--		1
Vinyl bromide	ND	0.200	--	ND	0.874	--		1
Acetone	21.6	1.00	--	51.3	2.38	--		1
Isopropanol	156	0.500	--	383	1.23	--	E	1
3-Chloropropene	ND	0.200	--	ND	0.626	--		1
Carbon disulfide	ND	0.200	--	ND	0.623	--		1
Vinyl acetate	ND	0.200	--	ND	0.704	--		1
2-Butanone	0.353	0.200	--	1.04	0.590	--		1
Ethyl Acetate	ND	0.500	--	ND	1.80	--		1
Tetrahydrofuran	ND	0.200	--	ND	0.590	--		1
n-Hexane	0.212	0.200	--	0.747	0.705	--		1
Cyclohexane	ND	0.200	--	ND	0.688	--		1
1,4-Dioxane	ND	0.200	--	ND	0.721	--		1
2,2,4-Trimethylpentane	ND	0.200	--	ND	0.934	--		1
Heptane	ND	0.200	--	ND	0.820	--		1
4-Methyl-2-pentanone	ND	0.200	--	ND	0.820	--		1
2-Hexanone	ND	0.200	--	ND	0.820	--		1
4-Ethyltoluene	2.53	0.200	--	12.4	0.983	--		1
Benzyl chloride	ND	0.200	--	ND	1.04	--		1

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1302224
Report Date: 02/15/13

SAMPLE RESULTS

Lab ID: L1302224-03
Client ID: S-157-J
Sample Location: BEVERLY, MA
Date Collected: 02/04/13 15:14
Date Received: 02/06/13
Field Prep: Not Specified

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
MCP Volatile Organics in Air - Mansfield Lab								

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-Difluorobenzene	85		60-140
Bromochloromethane	89		60-140
chlorobenzene-d5	87		60-140

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1302224
Report Date: 02/15/13

SAMPLE RESULTS

Lab ID: L1302224-03
Client ID: S-157-J
Sample Location: BEVERLY, MA
Matrix: Air
Anaytical Method: 101,TO15-SIM
Analytical Date: 02/08/13 20:31
Analyst: RY

Date Collected: 02/04/13 15:14
Date Received: 02/06/13
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
MCP Volatile Organics in Air by SIM - Mansfield Lab								
1,1,1-Trichloroethane	0.020	0.020	--	0.109	0.109	--		1
1,1,1,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
1,1,2,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
1,1,2-Trichloroethane	ND	0.020	--	ND	0.109	--		1
1,1-Dichloroethane	ND	0.020	--	ND	0.081	--		1
1,1-Dichloroethene	ND	0.020	--	ND	0.079	--		1
1,2,4-Trichlorobenzene	ND	0.050	--	ND	0.371	--		1
1,2,4-Trimethylbenzene	11.1	0.020	--	54.6	0.098	--		1
1,2-Dibromoethane	ND	0.020	--	ND	0.154	--		1
1,2-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,2-Dichloroethane	0.023	0.020	--	0.093	0.081	--		1
1,2-Dichloropropane	ND	0.020	--	ND	0.092	--		1
1,3,5-Trimethybenzene	2.74	0.020	--	13.5	0.098	--		1
1,3-Butadiene	0.023	0.020	--	0.051	0.044	--		1
1,3-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,4-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
Benzene	0.218	0.100	--	0.696	0.319	--		1
Bromodichloromethane	ND	0.020	--	ND	0.134	--		1
Bromoform	ND	0.020	--	ND	0.207	--		1
Bromomethane	ND	0.020	--	ND	0.078	--		1
Carbon tetrachloride	0.091	0.020	--	0.572	0.126	--		1
Chlorobenzene	ND	0.020	--	ND	0.092	--		1
Chloroethane	ND	0.020	--	ND	0.053	--		1
Chloroform	0.059	0.020	--	0.288	0.098	--		1

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1302224
Report Date: 02/15/13

SAMPLE RESULTS

Lab ID: L1302224-03
Client ID: S-157-J
Sample Location: BEVERLY, MA
Date Collected: 02/04/13 15:14
Date Received: 02/06/13
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	Results	RL	MDL	Results	RL	MDL	Qualifier	Dilution Factor
MCP Volatile Organics in Air by SIM - Mansfield Lab								
Chloromethane	ND	0.500	--	ND	1.03	--		1
cis-1,2-Dichloroethene	0.033	0.020	--	0.131	0.079	--		1
cis-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
Dibromochloromethane	ND	0.020	--	ND	0.170	--		1
Dichlorodifluoromethane	0.447	0.050	--	2.21	0.247	--		1
Ethylbenzene	0.222	0.020	--	0.964	0.087	--		1
Freon-113	0.064	0.050	--	0.491	0.383	--		1
Freon-114	ND	0.050	--	ND	0.349	--		1
Hexachlorobutadiene	ND	0.050	--	ND	0.533	--		1
Methylene chloride	ND	1.40	--	ND	4.86	--		1
Methyl tert butyl ether	ND	0.020	--	ND	0.072	--		1
Naphthalene	0.070	0.050	--	0.367	0.262	--		1
p/m-Xylene	0.738	0.040	--	3.21	0.174	--		1
o-Xylene	0.539	0.020	--	2.34	0.087	--		1
Styrene	0.089	0.020	--	0.379	0.085	--		1
Tetrachloroethene	0.027	0.020	--	0.183	0.136	--		1
Toluene	0.666	0.050	--	2.51	0.188	--		1
trans-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
trans-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
Trichloroethene	ND	0.020	--	ND	0.107	--		1
Trichlorofluoromethane	0.225	0.050	--	1.26	0.281	--		1
Vinyl chloride	ND	0.020	--	ND	0.051	--		1

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-difluorobenzene	85		60-140
bromochloromethane	90		60-140
chlorobenzene-d5	88		60-140

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1302224
Report Date: 02/15/13

SAMPLE RESULTS

Lab ID: L1302224-03 D
Client ID: S-157-J
Sample Location: BEVERLY, MA
Matrix: Air
Anaytical Method: 101,TO-15
Analytical Date: 02/12/13 20:43
Analyst: RY

Date Collected: 02/04/13 15:14
Date Received: 02/06/13
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
MCP Volatile Organics in Air - Mansfield Lab								
Isopropanol	161	1.25	--	396	3.07	--		2.5

Internal Standard	**% Recovery**	**Qualifier**	**Acceptance Criteria**
1,4-Difluorobenzene	81		60-140
Bromochloromethane	87		60-140
chlorobenzene-d5	81		60-140

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1302224
Report Date: 02/15/13

SAMPLE RESULTS

Lab ID: L1302224-04
Client ID: S-1100
Sample Location: BEVERLY, MA
Matrix: Air
Anaytical Method: 101,TO-15
Analytical Date: 02/08/13 21:03
Analyst: RY

Date Collected: 02/04/13 15:40
Date Received: 02/06/13
Field Prep: Not Specified

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
MCP Volatile Organics in Air - Mansfield Lab								
Propylene	ND	0.500	--	ND	0.861	--		1
Ethanol	204	2.50	--	384	4.71	--		1
Vinyl bromide	ND	0.200	--	ND	0.874	--		1
Acetone	7.69	1.00	--	18.3	2.38	--		1
Isopropanol	32.3	0.500	--	79.4	1.23	--		1
3-Chloropropene	ND	0.200	--	ND	0.626	--		1
Carbon disulfide	ND	0.200	--	ND	0.623	--		1
Vinyl acetate	ND	0.200	--	ND	0.704	--		1
2-Butanone	0.389	0.200	--	1.15	0.590	--		1
Ethyl Acetate	ND	0.500	--	ND	1.80	--		1
Tetrahydrofuran	ND	0.200	--	ND	0.590	--		1
n-Hexane	ND	0.200	--	ND	0.705	--		1
Cyclohexane	ND	0.200	--	ND	0.688	--		1
1,4-Dioxane	ND	0.200	--	ND	0.721	--		1
2,2,4-Trimethylpentane	ND	0.200	--	ND	0.934	--		1
Heptane	ND	0.200	--	ND	0.820	--		1
4-Methyl-2-pentanone	ND	0.200	--	ND	0.820	--		1
2-Hexanone	ND	0.200	--	ND	0.820	--		1
4-Ethyltoluene	ND	0.200	--	ND	0.983	--		1
Benzyl chloride	ND	0.200	--	ND	1.04	--		1

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1302224
Report Date: 02/15/13

SAMPLE RESULTS

Lab ID: L1302224-04
Client ID: S-1100
Sample Location: BEVERLY, MA
Date Collected: 02/04/13 15:40
Date Received: 02/06/13
Field Prep: Not Specified

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
MCP Volatile Organics in Air - Mansfield Lab								

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-Difluorobenzene	85		60-140
Bromochloromethane	70		60-140
chlorobenzene-d5	85		60-140

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1302224
Report Date: 02/15/13

SAMPLE RESULTS

Lab ID: L1302224-04
Client ID: S-1100
Sample Location: BEVERLY, MA
Matrix: Air
Anaytical Method: 101,TO15-SIM
Analytical Date: 02/08/13 21:03
Analyst: RY

Date Collected: 02/04/13 15:40
Date Received: 02/06/13
Field Prep: Not Specified

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
MCP Volatile Organics in Air by SIM - Mansfield Lab								
1,1,1-Trichloroethane	ND	0.020	--	ND	0.109	--		1
1,1,1,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
1,1,2,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
1,1,2-Trichloroethane	ND	0.020	--	ND	0.109	--		1
1,1-Dichloroethane	ND	0.020	--	ND	0.081	--		1
1,1-Dichloroethene	ND	0.020	--	ND	0.079	--		1
1,2,4-Trichlorobenzene	ND	0.050	--	ND	0.371	--		1
1,2,4-Trimethylbenzene	0.067	0.020	--	0.329	0.098	--		1
1,2-Dibromoethane	ND	0.020	--	ND	0.154	--		1
1,2-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,2-Dichloroethane	0.038	0.020	--	0.154	0.081	--		1
1,2-Dichloropropane	ND	0.020	--	ND	0.092	--		1
1,3,5-Trimethybenzene	ND	0.020	--	ND	0.098	--		1
1,3-Butadiene	ND	0.020	--	ND	0.044	--		1
1,3-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,4-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
Benzene	0.152	0.100	--	0.486	0.319	--		1
Bromodichloromethane	ND	0.020	--	ND	0.134	--		1
Bromoform	ND	0.020	--	ND	0.207	--		1
Bromomethane	ND	0.020	--	ND	0.078	--		1
Carbon tetrachloride	0.090	0.020	--	0.566	0.126	--		1
Chlorobenzene	ND	0.020	--	ND	0.092	--		1
Chloroethane	ND	0.020	--	ND	0.053	--		1
Chloroform	0.078	0.020	--	0.381	0.098	--		1

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1302224
Report Date: 02/15/13

SAMPLE RESULTS

Lab ID: L1302224-04
Client ID: S-1100
Sample Location: BEVERLY, MA
Date Collected: 02/04/13 15:40
Date Received: 02/06/13
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
MCP Volatile Organics in Air by SIM - Mansfield Lab								
Chloromethane	0.657	0.500	--	1.36	1.03	--		1
cis-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
cis-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
Dibromochloromethane	ND	0.020	--	ND	0.170	--		1
Dichlorodifluoromethane	0.583	0.050	--	2.88	0.247	--		1
Ethylbenzene	0.027	0.020	--	0.117	0.087	--		1
Freon-113	0.082	0.050	--	0.628	0.383	--		1
Freon-114	ND	0.050	--	ND	0.349	--		1
Hexachlorobutadiene	ND	0.050	--	ND	0.533	--		1
Methylene chloride	ND	1.40	--	ND	4.86	--		1
Methyl tert butyl ether	ND	0.020	--	ND	0.072	--		1
Naphthalene	ND	0.050	--	ND	0.262	--		1
p/m-Xylene	0.062	0.040	--	0.269	0.174	--		1
o-Xylene	0.026	0.020	--	0.113	0.087	--		1
Styrene	0.024	0.020	--	0.102	0.085	--		1
Tetrachloroethene	ND	0.020	--	ND	0.136	--		1
Toluene	0.229	0.050	--	0.863	0.188	--		1
trans-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
trans-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
Trichloroethene	ND	0.020	--	ND	0.107	--		1
Trichlorofluoromethane	0.283	0.050	--	1.59	0.281	--		1
Vinyl chloride	ND	0.020	--	ND	0.051	--		1

Internal Standard	**% Recovery**	**Qualifier**	**Acceptance Criteria**
1,4-difluorobenzene	85		60-140
bromochloromethane	70		60-140
chlorobenzene-d5	85		60-140

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1302224
Report Date: 02/15/13

SAMPLE RESULTS

Lab ID: L1302224-05
Client ID: S-171-X
Sample Location: BEVERLY, MA
Matrix: Air
Anaytical Method: 101,TO-15
Analytical Date: 02/08/13 21:34
Analyst: RY

Date Collected: 02/04/13 15:30
Date Received: 02/06/13
Field Prep: Not Specified

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
MCP Volatile Organics in Air - Mansfield Lab								
Propylene	ND	0.500	--	ND	0.861	--		1
Ethanol	24.8	2.50	--	46.7	4.71	--		1
Vinyl bromide	ND	0.200	--	ND	0.874	--		1
Acetone	3.72	1.00	--	8.84	2.38	--		1
Isopropanol	5.31	0.500	--	13.1	1.23	--		1
3-Chloropropene	ND	0.200	--	ND	0.626	--		1
Carbon disulfide	ND	0.200	--	ND	0.623	--		1
Vinyl acetate	ND	0.200	--	ND	0.704	--		1
2-Butanone	0.211	0.200	--	0.622	0.590	--		1
Ethyl Acetate	ND	0.500	--	ND	1.80	--		1
Tetrahydrofuran	ND	0.200	--	ND	0.590	--		1
n-Hexane	0.230	0.200	--	0.811	0.705	--		1
Cyclohexane	ND	0.200	--	ND	0.688	--		1
1,4-Dioxane	ND	0.200	--	ND	0.721	--		1
2,2,4-Trimethylpentane	ND	0.200	--	ND	0.934	--		1
Heptane	0.209	0.200	--	0.857	0.820	--		1
4-Methyl-2-pentanone	ND	0.200	--	ND	0.820	--		1
2-Hexanone	ND	0.200	--	ND	0.820	--		1
4-Ethyltoluene	ND	0.200	--	ND	0.983	--		1
Benzyl chloride	ND	0.200	--	ND	1.04	--		1

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1302224
Report Date: 02/15/13

SAMPLE RESULTS

Lab ID: L1302224-05
Client ID: S-171-X
Sample Location: BEVERLY, MA
Date Collected: 02/04/13 15:30
Date Received: 02/06/13
Field Prep: Not Specified

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
MCP Volatile Organics in Air - Mansfield Lab								

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-Difluorobenzene	84		60-140
Bromochloromethane	86		60-140
chlorobenzene-d5	82		60-140

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1302224
Report Date: 02/15/13

SAMPLE RESULTS

Lab ID: L1302224-05
Client ID: S-171-X
Sample Location: BEVERLY, MA
Matrix: Air
Anaytical Method: 101,TO15-SIM
Analytical Date: 02/08/13 21:34
Analyst: RY

Date Collected: 02/04/13 15:30
Date Received: 02/06/13
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
MCP Volatile Organics in Air by SIM - Mansfield Lab								
1,1,1-Trichloroethane	ND	0.020	--	ND	0.109	--		1
1,1,1,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
1,1,2,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
1,1,2-Trichloroethane	ND	0.020	--	ND	0.109	--		1
1,1-Dichloroethane	ND	0.020	--	ND	0.081	--		1
1,1-Dichloroethene	ND	0.020	--	ND	0.079	--		1
1,2,4-Trichlorobenzene	ND	0.050	--	ND	0.371	--		1
1,2,4-Trimethylbenzene	0.024	0.020	--	0.118	0.098	--		1
1,2-Dibromoethane	ND	0.020	--	ND	0.154	--		1
1,2-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,2-Dichloroethane	0.024	0.020	--	0.097	0.081	--		1
1,2-Dichloropropane	ND	0.020	--	ND	0.092	--		1
1,3,5-Trimethybenzene	ND	0.020	--	ND	0.098	--		1
1,3-Butadiene	ND	0.020	--	ND	0.044	--		1
1,3-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,4-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
Benzene	0.152	0.100	--	0.486	0.319	--		1
Bromodichloromethane	ND	0.020	--	ND	0.134	--		1
Bromoform	ND	0.020	--	ND	0.207	--		1
Bromomethane	ND	0.020	--	ND	0.078	--		1
Carbon tetrachloride	0.090	0.020	--	0.566	0.126	--		1
Chlorobenzene	ND	0.020	--	ND	0.092	--		1
Chloroethane	ND	0.020	--	ND	0.053	--		1
Chloroform	0.085	0.020	--	0.415	0.098	--		1

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1302224
Report Date: 02/15/13

SAMPLE RESULTS

Lab ID: L1302224-05
Client ID: S-171-X
Sample Location: BEVERLY, MA
Date Collected: 02/04/13 15:30
Date Received: 02/06/13
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
MCP Volatile Organics in Air by SIM - Mansfield Lab								
Chloromethane	ND	0.500	--	ND	1.03	--		1
cis-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
cis-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
Dibromochloromethane	ND	0.020	--	ND	0.170	--		1
Dichlorodifluoromethane	0.454	0.050	--	2.24	0.247	--		1
Ethylbenzene	0.026	0.020	--	0.113	0.087	--		1
Freon-113	0.078	0.050	--	0.598	0.383	--		1
Freon-114	ND	0.050	--	ND	0.349	--		1
Hexachlorobutadiene	ND	0.050	--	ND	0.533	--		1
Methylene chloride	ND	1.40	--	ND	4.86	--		1
Methyl tert butyl ether	ND	0.020	--	ND	0.072	--		1
Naphthalene	ND	0.050	--	ND	0.262	--		1
p/m-Xylene	0.066	0.040	--	0.287	0.174	--		1
o-Xylene	0.027	0.020	--	0.117	0.087	--		1
Styrene	0.029	0.020	--	0.123	0.085	--		1
Tetrachloroethene	ND	0.020	--	ND	0.136	--		1
Toluene	0.164	0.050	--	0.618	0.188	--		1
trans-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
trans-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
Trichloroethene	ND	0.020	--	ND	0.107	--		1
Trichlorofluoromethane	0.233	0.050	--	1.31	0.281	--		1
Vinyl chloride	ND	0.020	--	ND	0.051	--		1

Internal Standard	**% Recovery**	**Qualifier**	**Acceptance Criteria**
1,4-difluorobenzene	84		60-140
bromochloromethane	88		60-140
chlorobenzene-d5	82		60-140

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1302224
Report Date: 02/15/13

SAMPLE RESULTS

Lab ID: L1302224-06
Client ID: NEPD
Sample Location: BEVERLY, MA
Matrix: Air
Anaytical Method: 101,TO-15
Analytical Date: 02/08/13 22:06
Analyst: RY

Date Collected: 02/04/13 15:20
Date Received: 02/06/13
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
MCP Volatile Organics in Air - Mansfield Lab								
Propylene	ND	0.500	--	ND	0.861	--		1
Ethanol	ND	2.50	--	ND	4.71	--		1
Vinyl bromide	ND	0.200	--	ND	0.874	--		1
Acetone	1.60	1.00	--	3.80	2.38	--		1
Isopropanol	ND	0.500	--	ND	1.23	--		1
3-Chloropropene	ND	0.200	--	ND	0.626	--		1
Carbon disulfide	ND	0.200	--	ND	0.623	--		1
Vinyl acetate	ND	0.200	--	ND	0.704	--		1
2-Butanone	0.210	0.200	--	0.619	0.590	--		1
Ethyl Acetate	ND	0.500	--	ND	1.80	--		1
Tetrahydrofuran	ND	0.200	--	ND	0.590	--		1
n-Hexane	0.666	0.200	--	2.35	0.705	--		1
Cyclohexane	ND	0.200	--	ND	0.688	--		1
1,4-Dioxane	ND	0.200	--	ND	0.721	--		1
2,2,4-Trimethylpentane	ND	0.200	--	ND	0.934	--		1
Heptane	ND	0.200	--	ND	0.820	--		1
4-Methyl-2-pentanone	ND	0.200	--	ND	0.820	--		1
2-Hexanone	ND	0.200	--	ND	0.820	--		1
4-Ethyltoluene	ND	0.200	--	ND	0.983	--		1
Benzyl chloride	ND	0.200	--	ND	1.04	--		1

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1302224
Report Date: 02/15/13

SAMPLE RESULTS

Lab ID: L1302224-06
Client ID: NEPD
Sample Location: BEVERLY, MA
Date Collected: 02/04/13 15:20
Date Received: 02/06/13
Field Prep: Not Specified

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
MCP Volatile Organics in Air - Mansfield Lab								

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-Difluorobenzene	87		60-140
Bromochloromethane	90		60-140
chlorobenzene-d5	87		60-140

Project Name: CUMMINGS BEVERLY AIR SAMPLING **Lab Number:** L1302224

Project Number: 12201 **Report Date:** 02/15/13

SAMPLE RESULTS

Lab ID: L1302224-06
Client ID: NEPD
Sample Location: BEVERLY, MA
Matrix: Air
Anaytical Method: 101,TO15-SIM
Analytical Date: 02/08/13 22:06
Analyst: RY

Date Collected: 02/04/13 15:20
Date Received: 02/06/13
Field Prep: Not Specified

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
MCP Volatile Organics in Air by SIM - Mansfield Lab								
1,1,1-Trichloroethane	ND	0.020	--	ND	0.109	--		1
1,1,1,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
1,1,2,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
1,1,2-Trichloroethane	ND	0.020	--	ND	0.109	--		1
1,1-Dichloroethane	ND	0.020	--	ND	0.081	--		1
1,1-Dichloroethene	ND	0.020	--	ND	0.079	--		1
1,2,4-Trichlorobenzene	ND	0.050	--	ND	0.371	--		1
1,2,4-Trimethylbenzene	ND	0.020	--	ND	0.098	--		1
1,2-Dibromoethane	ND	0.020	--	ND	0.154	--		1
1,2-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,2-Dichloroethane	ND	0.020	--	ND	0.081	--		1
1,2-Dichloropropane	ND	0.020	--	ND	0.092	--		1
1,3,5-Trimethybenzene	ND	0.020	--	ND	0.098	--		1
1,3-Butadiene	ND	0.020	--	ND	0.044	--		1
1,3-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,4-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
Benzene	0.152	0.100	--	0.486	0.319	--		1
Bromodichloromethane	ND	0.020	--	ND	0.134	--		1
Bromoform	ND	0.020	--	ND	0.207	--		1
Bromomethane	ND	0.020	--	ND	0.078	--		1
Carbon tetrachloride	0.087	0.020	--	0.547	0.126	--		1
Chlorobenzene	ND	0.020	--	ND	0.092	--		1
Chloroethane	ND	0.020	--	ND	0.053	--		1
Chloroform	ND	0.020	--	ND	0.098	--		1

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1302224
Report Date: 02/15/13

SAMPLE RESULTS

Lab ID: L1302224-06
Client ID: NEPD
Sample Location: BEVERLY, MA
Date Collected: 02/04/13 15:20
Date Received: 02/06/13
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
MCP Volatile Organics in Air by SIM - Mansfield Lab								
Chloromethane	ND	0.500	--	ND	1.03	--		1
cis-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
cis-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
Dibromochloromethane	ND	0.020	--	ND	0.170	--		1
Dichlorodifluoromethane	0.451	0.050	--	2.23	0.247	--		1
Ethylbenzene	0.020	0.020	--	ND	0.087	--		1
Freon-113	0.063	0.050	--	0.483	0.383	--		1
Freon-114	ND	0.050	--	ND	0.349	--		1
Hexachlorobutadiene	ND	0.050	--	ND	0.533	--		1
Methylene chloride	3.82	1.40	--	13.3	4.86	--		1
Methyl tert butyl ether	ND	0.020	--	ND	0.072	--		1
Naphthalene	ND	0.050	--	ND	0.262	--		1
p/m-Xylene	0.054	0.040	--	0.235	0.174	--		1
o-Xylene	0.022	0.020	--	0.096	0.087	--		1
Styrene	ND	0.020	--	ND	0.085	--		1
Tetrachloroethene	ND	0.020	--	ND	0.136	--		1
Toluene	0.141	0.050	--	0.531	0.188	--		1
trans-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
trans-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
Trichloroethene	ND	0.020	--	ND	0.107	--		1
Trichlorofluoromethane	0.215	0.050	--	1.21	0.281	--		1
Vinyl chloride	ND	0.020	--	ND	0.051	--		1

Internal Standard	**% Recovery**	**Qualifier**	**Acceptance Criteria**
1,4-difluorobenzene	87		60-140
bromochloromethane	92		60-140
chlorobenzene-d5	88		60-140

Project Name: CUMMINGS BEVERLY AIR SAMPLING **Lab Number:** L1302224

Project Number: 12201 **Report Date:** 02/15/13

Method Blank Analysis
Batch Quality Control

Analytical Method: 101,TO-15
Analytical Date: 02/08/13 14:12

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
MCP Volatile Organics in Air - Mansfield Lab for sample(s): 01-06 Batch: WG589503-4								
Propylene	ND	0.500	--	ND	0.861	--		1
Ethanol	ND	2.50	--	ND	4.71	--		1
Vinyl bromide	ND	0.200	--	ND	0.874	--		1
Acetone	ND	1.00	--	ND	2.38	--		1
Isopropanol	ND	0.500	--	ND	1.23	--		1
3-Chloropropene	ND	0.200	--	ND	0.626	--		1
Carbon disulfide	ND	0.200	--	ND	0.623	--		1
Vinyl acetate	ND	0.200	--	ND	0.704	--		1
2-Butanone	ND	0.200	--	ND	0.590	--		1
Ethyl Acetate	ND	0.500	--	ND	1.80	--		1
Tetrahydrofuran	ND	0.200	--	ND	0.590	--		1
n-Hexane	ND	0.200	--	ND	0.705	--		1
Cyclohexane	ND	0.200	--	ND	0.688	--		1
1,4-Dioxane	ND	0.200	--	ND	0.721	--		1
2,2,4-Trimethylpentane	ND	0.200	--	ND	0.934	--		1
Heptane	ND	0.200	--	ND	0.820	--		1
4-Methyl-2-pentanone	ND	0.200	--	ND	0.820	--		1
2-Hexanone	ND	0.200	--	ND	0.820	--		1
4-Ethyltoluene	ND	0.200	--	ND	0.983	--		1
Benzyl chloride	ND	0.200	--	ND	1.04	--		1

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201
Lab Number: L1302224
Report Date: 02/15/13

Method Blank Analysis
Batch Quality Control

Analytical Method: 101,TO-15
Analytical Date: 02/12/13 14:40

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
MCP Volatile Organics in Air - Mansfield Lab for sample(s): 03 Batch: WG589503-9								
Isopropanol	ND	0.500	--	ND	1.23	--		1

Project Name: CUMMINGS BEVERLY AIR SAMPLING **Lab Number:** L1302224

Project Number: 12201 **Report Date:** 02/15/13

Method Blank Analysis
Batch Quality Control

Analytical Method: 101,TO15-SIM
Analytical Date: 02/08/13 14:12

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
MCP Volatile Organics in Air by SIM - Mansfield Lab for sample(s): 01-06 Batch: WG589504-4								
1,1,1-Trichloroethane	ND	0.020	--	ND	0.109	--		1
1,1,1,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
1,1,2,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
1,1,2-Trichloroethane	ND	0.020	--	ND	0.109	--		1
1,1-Dichloroethane	ND	0.020	--	ND	0.081	--		1
1,1-Dichloroethene	ND	0.020	--	ND	0.079	--		1
1,2,4-Trichlorobenzene	ND	0.050	--	ND	0.371	--		1
1,2,4-Trimethylbenzene	ND	0.020	--	ND	0.098	--		1
1,2-Dibromoethane	ND	0.020	--	ND	0.154	--		1
1,2-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,2-Dichloroethane	ND	0.020	--	ND	0.081	--		1
1,2-Dichloropropane	ND	0.020	--	ND	0.092	--		1
1,3,5-Trimethybenzene	ND	0.020	--	ND	0.098	--		1
1,3-Butadiene	ND	0.020	--	ND	0.044	--		1
1,3-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,4-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
Benzene	ND	0.100	--	ND	0.319	--		1
Bromodichloromethane	ND	0.020	--	ND	0.134	--		1
Bromoform	ND	0.020	--	ND	0.207	--		1
Bromomethane	ND	0.020	--	ND	0.078	--		1
Carbon tetrachloride	ND	0.020	--	ND	0.126	--		1
Chlorobenzene	ND	0.020	--	ND	0.092	--		1
Chloroethane	ND	0.020	--	ND	0.053	--		1
Chloroform	ND	0.020	--	ND	0.098	--		1
Chloromethane	ND	0.500	--	ND	1.03	--		1

Project Name: CUMMINGS BEVERLY AIR SAMPLING **Lab Number:** L1302224

Project Number: 12201 **Report Date:** 02/15/13

Method Blank Analysis
Batch Quality Control

Analytical Method: 101,TO15-SIM
Analytical Date: 02/08/13 14:12

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
MCP Volatile Organics in Air by SIM - Mansfield Lab for sample(s): 01-06 Batch: WG589504-4								
cis-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
cis-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
Dibromochloromethane	ND	0.020	--	ND	0.170	--		1
Dichlorodifluoromethane	ND	0.050	--	ND	0.247	--		1
Ethylbenzene	ND	0.020	--	ND	0.087	--		1
Freon-113	ND	0.050	--	ND	0.383	--		1
Freon-114	ND	0.050	--	ND	0.349	--		1
Hexachlorobutadiene	ND	0.050	--	ND	0.533	--		1
Methylene chloride	ND	1.40	--	ND	4.86	--		1
Methyl tert butyl ether	ND	0.020	--	ND	0.072	--		1
Naphthalene	ND	0.050	--	ND	0.262	--		1
p/m-Xylene	ND	0.040	--	ND	0.174	--		1
o-Xylene	ND	0.020	--	ND	0.087	--		1
Styrene	ND	0.020	--	ND	0.085	--		1
Tetrachloroethene	ND	0.020	--	ND	0.136	--		1
Toluene	ND	0.050	--	ND	0.188	--		1
trans-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
trans-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
Trichloroethene	ND	0.020	--	ND	0.107	--		1
Trichlorofluoromethane	ND	0.050	--	ND	0.281	--		1
Vinyl chloride	ND	0.020	--	ND	0.051	--		1

Lab Control Sample Analysis

Batch Quality Control

Project Name: CUMMINGS BEVERLY AIR SAMPLING

Project Number: 12201

Lab Number: L1302224

Report Date: 02/15/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
MCP Volatile Organics in Air - Mansfield Lab Associated sample(s): 01-06 Batch: WG589503-3								
Propylene	90		-		70-130	-		
Ethyl Alcohol	75		-		70-130	-		
Vinyl bromide	87		-		70-130	-		
Acetone	90		-		50-150	-		
iso-Propyl Alcohol	85		-		70-130	-		
3-Chloropropene	84		-		70-130	-		
Carbon disulfide	78		-		70-130	-		
Vinyl acetate	85		-		70-130	-		
2-Butanone	92		-		70-130	-		
Ethyl Acetate	85		-		70-130	-		
Tetrahydrofuran	84		-		70-130	-		
n-Hexane	93		-		70-130	-		
Cyclohexane	91		-		70-130	-		
1,4-Dioxane	88		-		50-150	-		
2,2,4-Trimethylpentane	92		-		70-130	-		
Heptane	93		-		70-130	-		
4-Methyl-2-pentanone	92		-		70-130	-		
2-Hexanone	96		-		70-130	-		
4-Ethyltoluene	94		-		70-130	-		
Benzyl chloride	96		-		70-130	-		

Lab Control Sample Analysis

Batch Quality Control

Project Name: CUMMINGS BEVERLY AIR SAMPLING

Project Number: 12201

Lab Number: L1302224

Report Date: 02/15/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
MCP Volatile Organics in Air - Mansfield Lab Associated sample(s): 03 Batch: WG589503-8								
iso-Propyl Alcohol	85		-		70-130	-		
MCP Volatile Organics in Air by SIM - Mansfield Lab Associated sample(s): 01-06 Batch: WG589504-3								
1,1,1-Trichloroethane	106		-		70-130	-		
1,1,2,2-Tetrachloroethane	101		-		70-130	-		
1,1,2-Trichloroethane	99		-		70-130	-		
1,1-Dichloroethane	83		-		70-130	-		
1,1-Dichloroethene	86		-		70-130	-		
1,2,4-Trichlorobenzene	121		-		50-150	-		
1,2,4-Trimethylbenzene	108		-		70-130	-		
1,2-Dibromoethane	102		-		70-130	-		
1,2-Dichlorobenzene	112		-		70-130	-		

Lab Control Sample Analysis

Batch Quality Control

Project Name: CUMMINGS BEVERLY AIR SAMPLING

Project Number: 12201

Lab Number: L1302224

Report Date: 02/15/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
MCP Volatile Organics in Air by SIM - Mansfield Lab Associated sample(s): 01-06 Batch: WG589504-3								
1,2-Dichloroethane	92		-		70-130	-		
1,2-Dichloropropane	92		-		70-130	-		
1,3,5-Trimethylbenzene	103		-		70-130	-		
1,3-Butadiene	87		-		70-130	-		
1,3-Dichlorobenzene	111		-		70-130	-		
1,4-Dichlorobenzene	110		-		70-130	-		
1,4-Dioxane	86		-		50-150	-		
Acetone	87		-		50-150	-		
Benzene	87		-		70-130	-		
Bromodichloromethane	100		-		70-130	-		
Bromoform	97		-		70-130	-		
Bromomethane	83		-		70-130	-		
Carbon tetrachloride	109		-		70-130	-		
Chlorobenzene	102		-		70-130	-		
Chloroethane	78		-		70-130	-		
Chloroform	96		-		70-130	-		
Chloromethane	83		-		70-130	-		
cis-1,2-Dichloroethene	89		-		70-130	-		
cis-1,3-Dichloropropene	96		-		70-130	-		
Dibromochloromethane	103		-		70-130	-		
Dichlorodifluoromethane	95		-		70-130	-		

Lab Control Sample Analysis

Batch Quality Control

Project Name: CUMMINGS BEVERLY AIR SAMPLING

Project Number: 12201

Lab Number: L1302224

Report Date: 02/15/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
MCP Volatile Organics in Air by SIM - Mansfield Lab Associated sample(s): 01-06 Batch: WG589504-3								
Ethylbenzene	98		-		70-130	-		
1,1,2-Trichloro-1,2,2-Trifluoroethane	89		-		70-130	-		
1,2-Dichloro-1,1,2,2-tetrafluoroethane	86		-		70-130	-		
Hexachlorobutadiene	119		-		50-150	-		
2-Butanone	73		-		70-130	-		
4-Methyl-2-pentanone	92		-		70-130	-		
Methylene chloride	85		-		70-130	-		
Methyl tert butyl ether	81		-		70-130	-		
Naphthalene	103		-		50-150	-		
p/m-Xylene	99		-		70-130	-		
o-Xylene	102		-		70-130	-		
Styrene	100		-		70-130	-		
Tetrachloroethene	102		-		70-130	-		
Toluene	91		-		70-130	-		
trans-1,2-Dichloroethene	76		-		70-130	-		
trans-1,3-Dichloropropene	84		-		70-130	-		
Trichloroethene	101		-		70-130	-		
Trichlorofluoromethane	97		-		70-130	-		
Vinyl chloride	81		-		70-130	-		
Halothane	77		-		70-130	-		
1,2,3-Trichlorobenzene	119		-		70-130	-		

Lab Duplicate Analysis
Batch Quality Control

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201

Lab Number: L1302224
Report Date: 02/15/13

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
MCP Volatile Organics in Air - Mansfield Lab Associated sample(s): 01-06 QC Batch ID: WG589503-5 QC Sample: L1302224-01 Client ID: S-149-J						
Propylene	ND	ND	ppbV	NC		25
Ethanol	141	144	ppbV	2		25
Vinyl bromide	ND	ND	ppbV	NC		25
Acetone	9.44	9.36	ppbV	1		25
Isopropanol	55.9	56.8	ppbV	2		25
3-Chloropropene	ND	ND	ppbV	NC		25
Carbon disulfide	ND	ND	ppbV	NC		25
Vinyl acetate	ND	ND	ppbV	NC		25
2-Butanone	0.364	0.326	ppbV	11		25
Ethyl Acetate	ND	ND	ppbV	NC		25
Tetrahydrofuran	ND	ND	ppbV	NC		25
n-Hexane	0.231	0.228	ppbV	1		25
Cyclohexane	ND	ND	ppbV	NC		25
1,4-Dioxane	ND	ND	ppbV	NC		25
2,2,4-Trimethylpentane	ND	ND	ppbV	NC		25
Heptane	ND	ND	ppbV	NC		25
4-Methyl-2-pentanone	ND	ND	ppbV	NC		25
2-Hexanone	ND	ND	ppbV	NC		25
4-Ethyltoluene	ND	ND	ppbV	NC		25

Lab Duplicate Analysis
Batch Quality Control

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201

Lab Number: L1302224
Report Date: 02/15/13

Parameter	Native Sample	Duplicate Sample	Units	RPD	RPD Limits
MCP Volatile Organics in Air - Mansfield Lab Associated sample(s): 01-06 QC Batch ID: WG589503-5 QC Sample: L1302224-01 Client ID: S-149-J					
Benzyl chloride	ND	ND	ppbV	NC	25

Lab Duplicate Analysis
Batch Quality Control

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201

Lab Number: L1302224
Report Date: 02/15/13

Parameter	Native Sample	Duplicate Sample	Units	RPD	RPD Limits
MCP Volatile Organics in Air by SIM - Mansfield Lab Associated sample(s): 01-06 QC Batch ID: WG589504-5 QC Sample: L1302224-01 Client ID: S-149-J					
1,1,1-Trichloroethane	0.038	0.039	ppbV	3	25
1,1,1,2-Tetrachloroethane	ND	ND	ppbV	NC	25
1,1,2,2-Tetrachloroethane	ND	ND	ppbV	NC	25
1,1,2-Trichloroethane	ND	ND	ppbV	NC	25
1,1-Dichloroethane	ND	ND	ppbV	NC	25
1,1-Dichloroethene	ND	ND	ppbV	NC	25
1,2,4-Trichlorobenzene	ND	ND	ppbV	NC	25
1,2,4-Trimethylbenzene	0.117	0.124	ppbV	6	25
1,2-Dibromoethane	ND	ND	ppbV	NC	25
1,2-Dichlorobenzene	ND	ND	ppbV	NC	25
1,2-Dichloroethane	0.026	0.027	ppbV	4	25
1,2-Dichloropropane	ND	ND	ppbV	NC	25
1,3,5-Trimethybenzene	0.035	0.036	ppbV	3	25
1,3-Butadiene	ND	ND	ppbV	NC	25
1,3-Dichlorobenzene	ND	ND	ppbV	NC	25
1,4-Dichlorobenzene	ND	ND	ppbV	NC	25
Benzene	0.183	0.187	ppbV	2	25
Bromodichloromethane	0.021	0.022	ppbV	5	25
Bromoform	ND	ND	ppbV	NC	25

Lab Duplicate Analysis
Batch Quality Control

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201

Lab Number: L1302224
Report Date: 02/15/13

Parameter	Native Sample	Duplicate Sample	Units	RPD	RPD Limits
MCP Volatile Organics in Air by SIM - Mansfield Lab Associated sample(s): 01-06 QC Batch ID: WG589504-5 QC Sample: L1302224-01 Client ID: S-149-J					
Bromomethane	ND	ND	ppbV	NC	25
Carbon tetrachloride	0.094	0.094	ppbV	0	25
Chlorobenzene	ND	ND	ppbV	NC	25
Chloroethane	ND	ND	ppbV	NC	25
Chloroform	0.092	0.093	ppbV	1	25
Chloromethane	ND	0.501	ppbV	NC	25
cis-1,2-Dichloroethene	ND	ND	ppbV	NC	25
cis-1,3-Dichloropropene	ND	ND	ppbV	NC	25
Dibromochloromethane	ND	ND	ppbV	NC	25
Dichlorodifluoromethane	0.475	0.452	ppbV	5	25
Ethylbenzene	0.067	0.071	ppbV	6	25
Freon-113	0.064	0.065	ppbV	2	25
Freon-114	ND	ND	ppbV	NC	25
Hexachlorobutadiene	ND	ND	ppbV	NC	25
Methylene chloride	ND	ND	ppbV	NC	25
Methyl tert butyl ether	ND	ND	ppbV	NC	25
Naphthalene	ND	ND	ppbV	NC	25
p/m-Xylene	0.208	0.221	ppbV	6	25
o-Xylene	0.091	0.097	ppbV	6	25

Lab Duplicate Analysis
Batch Quality Control

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201

Lab Number: L1302224
Report Date: 02/15/13

Parameter	Native Sample	Duplicate Sample	Units	RPD	RPD Limits
MCP Volatile Organics in Air by SIM - Mansfield Lab Associated sample(s): 01-06 QC Batch ID: WG589504-5 QC Sample: L1302224-01 Client ID: S-149-J					
Styrene	0.083	0.088	ppbV	6	25
Tetrachloroethene	ND	ND	ppbV	NC	25
Toluene	0.290	0.306	ppbV	5	25
trans-1,2-Dichloroethene	ND	ND	ppbV	NC	25
trans-1,3-Dichloropropene	ND	ND	ppbV	NC	25
Trichloroethene	ND	ND	ppbV	NC	25
Trichlorofluoromethane	0.221	0.224	ppbV	1	25
Vinyl chloride	ND	ND	ppbV	NC	25

Project Name: CUMMINGS BEVERLY AIR SAMPLING **Lab Number:** L1302224

Project Number: 12201 **Report Date:** 02/15/13

SAMPLE RESULTS

Lab ID:	L1302224-01	Date Collected:	02/04/13 15:05
Client ID:	S-149-J	Date Received:	02/06/13
Sample Location:	BEVERLY, MA	Field Prep:	Not Specified
Matrix:	Air		
Analytical Method:	96,APH		
Analytical Date:	02/08/13 18:56		
Analyst:	RY		

Quality Control Information

Sample Type:	24 Hour Composite
Sample Container Type:	Canister - 6 Liter
Sampling Flow Controller:	Mechanical
Sampling Zone:	Unknown
Sampling Flow Meter RPD of pre & post-sampling calibration check:	<=20%
Were all QA/QC procedures REQUIRED by the method followed?	Yes
Were all performance/acceptance standards for the required procedures achieved?	Yes
Were significant modifications made to the method as specified in Sect 11.1.2?	No

Petroleum Hydrocarbons in Air - Mansfield Lab

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
1,3-Butadiene	ND		ug/m3	2.0	--	1
Methyl tert butyl ether	ND		ug/m3	2.0	--	1
Benzene	ND		ug/m3	2.0	--	1
C5-C8 Aliphatics, Adjusted	24		ug/m3	12	--	1
Toluene	ND		ug/m3	2.0	--	1
Ethylbenzene	ND		ug/m3	2.0	--	1
p/m-Xylene	ND		ug/m3	4.0	--	1
o-Xylene	ND		ug/m3	2.0	--	1
Naphthalene	ND		ug/m3	2.0	--	1
C9-C12 Aliphatics, Adjusted	110		ug/m3	14	--	1
C9-C10 Aromatics Total	ND		ug/m3	10	--	1

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-Difluorobenzene	81		50-200
Bromochloromethane	87		50-200
Chlorobenzene-d5	83		50-200

Project Name: CUMMINGS BEVERLY AIR SAMPLING **Lab Number:** L1302224

Project Number: 12201 **Report Date:** 02/15/13

SAMPLE RESULTS

Lab ID:	L1302224-02	Date Collected:	02/04/13 15:07
Client ID:	DUP	Date Received:	02/06/13
Sample Location:	BEVERLY, MA	Field Prep:	Not Specified
Matrix:	Air		
Analytical Method:	96,APH		
Analytical Date:	02/08/13 19:59		
Analyst:	RY		

Quality Control Information

Sample Type:	24 Hour Composite
Sample Container Type:	Canister - 6 liter
Sampling Flow Controller:	Mechanical
Sampling Zone:	Unknown
Sampling Flow Meter RPD of pre & post-sampling calibration check:	<=20%
Were all QA/QC procedures REQUIRED by the method followed?	Yes
Were all performance/acceptance standards for the required procedures achieved?	Yes
Were significant modifications made to the method as specified in Sect 11.1.2?	No

Petroleum Hydrocarbons in Air - Mansfield Lab

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
1,3-Butadiene	ND		ug/m3	2.0	--	1
Methyl tert butyl ether	ND		ug/m3	2.0	--	1
Benzene	ND		ug/m3	2.0	--	1
C5-C8 Aliphatics, Adjusted	16		ug/m3	12	--	1
Toluene	ND		ug/m3	2.0	--	1
Ethylbenzene	ND		ug/m3	2.0	--	1
p/m-Xylene	ND		ug/m3	4.0	--	1
o-Xylene	ND		ug/m3	2.0	--	1
Naphthalene	ND		ug/m3	2.0	--	1
C9-C12 Aliphatics, Adjusted	43		ug/m3	14	--	1
C9-C10 Aromatics Total	ND		ug/m3	10	--	1

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-Difluorobenzene	81		50-200
Bromochloromethane	89		50-200
Chlorobenzene-d5	82		50-200

Project Name: CUMMINGS BEVERLY AIR SAMPLING **Lab Number:** L1302224

Project Number: 12201 **Report Date:** 02/15/13

SAMPLE RESULTS

Lab ID:	L1302224-03	Date Collected:	02/04/13 15:14
Client ID:	S-157-J	Date Received:	02/06/13
Sample Location:	BEVERLY, MA	Field Prep:	Not Specified
Matrix:	Air		
Analytical Method:	96,APH		
Analytical Date:	02/08/13 20:31		
Analyst:	RY		

Quality Control Information

Sample Type:	24 Hour Composite
Sample Container Type:	Canister - 6 Liter
Sampling Flow Controller:	Mechanical
Sampling Zone:	Unknown
Sampling Flow Meter RPD of pre & post-sampling calibration check:	<=20%
Were all QA/QC procedures REQUIRED by the method followed?	Yes
Were all performance/acceptance standards for the required procedures achieved?	Yes
Were significant modifications made to the method as specified in Sect 11.1.2?	No

Petroleum Hydrocarbons in Air - Mansfield Lab

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
1,3-Butadiene	ND		ug/m3	2.0	--	1
Methyl tert butyl ether	ND		ug/m3	2.0	--	1
Benzene	ND		ug/m3	2.0	--	1
C5-C8 Aliphatics, Adjusted	41		ug/m3	12	--	1
Toluene	2.5		ug/m3	2.0	--	1
Ethylbenzene	ND		ug/m3	2.0	--	1
p/m-Xylene	ND		ug/m3	4.0	--	1
o-Xylene	2.3		ug/m3	2.0	--	1
Naphthalene	ND		ug/m3	2.0	--	1
C9-C12 Aliphatics, Adjusted	200		ug/m3	14	--	1
C9-C10 Aromatics Total	160		ug/m3	10	--	1

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-Difluorobenzene	82		50-200
Bromochloromethane	90		50-200
Chlorobenzene-d5	81		50-200

Project Name: CUMMINGS BEVERLY AIR SAMPLING **Lab Number:** L1302224

Project Number: 12201 **Report Date:** 02/15/13

SAMPLE RESULTS

Lab ID:	L1302224-04	Date Collected:	02/04/13 15:40
Client ID:	S-1100	Date Received:	02/06/13
Sample Location:	BEVERLY, MA	Field Prep:	Not Specified
Matrix:	Air		
Analytical Method:	96,APH		
Analytical Date:	02/08/13 21:03		
Analyst:	RY		

Quality Control Information

Sample Type:	24 Hour Composite
Sample Container Type:	Canister - 6 Liter
Sampling Flow Controller:	Mechanical
Sampling Zone:	Unknown
Sampling Flow Meter RPD of pre & post-sampling calibration check:	<=20%
Were all QA/QC procedures REQUIRED by the method followed?	Yes
Were all performance/acceptance standards for the required procedures achieved?	Yes
Were significant modifications made to the method as specified in Sect 11.1.2?	No

Petroleum Hydrocarbons in Air - Mansfield Lab

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
1,3-Butadiene	ND		ug/m3	2.0	--	1
Methyl tert butyl ether	ND		ug/m3	2.0	--	1
Benzene	ND		ug/m3	2.0	--	1
C5-C8 Aliphatics, Adjusted	18		ug/m3	12	--	1
Toluene	ND		ug/m3	2.0	--	1
Ethylbenzene	ND		ug/m3	2.0	--	1
p/m-Xylene	ND		ug/m3	4.0	--	1
o-Xylene	ND		ug/m3	2.0	--	1
Naphthalene	ND		ug/m3	2.0	--	1
C9-C12 Aliphatics, Adjusted	44		ug/m3	14	--	1
C9-C10 Aromatics Total	ND		ug/m3	10	--	1

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-Difluorobenzene	82		50-200
Bromochloromethane	78		50-200
Chlorobenzene-d5	79		50-200

Project Name: CUMMINGS BEVERLY AIR SAMPLING **Lab Number:** L1302224

Project Number: 12201 **Report Date:** 02/15/13

SAMPLE RESULTS

Lab ID:	L1302224-05	Date Collected:	02/04/13 15:30
Client ID:	S-171-X	Date Received:	02/06/13
Sample Location:	BEVERLY, MA	Field Prep:	Not Specified
Matrix:	Air		
Analytical Method:	96,APH		
Analytical Date:	02/08/13 21:34		
Analyst:	RY		

Quality Control Information

Sample Type:	24 Hour Composite
Sample Container Type:	Canister - 6 Liter
Sampling Flow Controller:	Mechanical
Sampling Zone:	Unknown
Sampling Flow Meter RPD of pre & post-sampling calibration check:	<=20%
Were all QA/QC procedures REQUIRED by the method followed?	Yes
Were all performance/acceptance standards for the required procedures achieved?	Yes
Were significant modifications made to the method as specified in Sect 11.1.2?	No

Petroleum Hydrocarbons in Air - Mansfield Lab

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
1,3-Butadiene	ND		ug/m3	2.0	--	1
Methyl tert butyl ether	ND		ug/m3	2.0	--	1
Benzene	ND		ug/m3	2.0	--	1
C5-C8 Aliphatics, Adjusted	18		ug/m3	12	--	1
Toluene	ND		ug/m3	2.0	--	1
Ethylbenzene	ND		ug/m3	2.0	--	1
p/m-Xylene	ND		ug/m3	4.0	--	1
o-Xylene	ND		ug/m3	2.0	--	1
Naphthalene	ND		ug/m3	2.0	--	1
C9-C12 Aliphatics, Adjusted	25		ug/m3	14	--	1
C9-C10 Aromatics Total	ND		ug/m3	10	--	1

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-Difluorobenzene	81		50-200
Bromochloromethane	85		50-200
Chlorobenzene-d5	76		50-200

Project Name: CUMMINGS BEVERLY AIR SAMPLING **Lab Number:** L1302224

Project Number: 12201 **Report Date:** 02/15/13

SAMPLE RESULTS

Lab ID:	L1302224-06	Date Collected:	02/04/13 15:20
Client ID:	NEPD	Date Received:	02/06/13
Sample Location:	BEVERLY, MA	Field Prep:	Not Specified
Matrix:	Air		
Analytical Method:	96,APH		
Analytical Date:	02/08/13 22:06		
Analyst:	RY		

Quality Control Information

Sample Type:	24 Hour Composite
Sample Container Type:	Canister - 6 Liter
Sampling Flow Controller:	Mechanical
Sampling Zone:	Unknown
Sampling Flow Meter RPD of pre & post-sampling calibration check:	<=20%
Were all QA/QC procedures REQUIRED by the method followed?	Yes
Were all performance/acceptance standards for the required procedures achieved?	Yes
Were significant modifications made to the method as specified in Sect 11.1.2?	No

Petroleum Hydrocarbons in Air - Mansfield Lab

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
1,3-Butadiene	ND		ug/m3	2.0	--	1
Methyl tert butyl ether	ND		ug/m3	2.0	--	1
Benzene	ND		ug/m3	2.0	--	1
C5-C8 Aliphatics, Adjusted	ND		ug/m3	12	--	1
Toluene	ND		ug/m3	2.0	--	1
Ethylbenzene	ND		ug/m3	2.0	--	1
p/m-Xylene	ND		ug/m3	4.0	--	1
o-Xylene	ND		ug/m3	2.0	--	1
Naphthalene	ND		ug/m3	2.0	--	1
C9-C12 Aliphatics, Adjusted	ND		ug/m3	14	--	1
C9-C10 Aromatics Total	ND		ug/m3	10	--	1

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-Difluorobenzene	84		50-200
Bromochloromethane	89		50-200
Chlorobenzene-d5	82		50-200

Project Name: CUMMINGS BEVERLY AIR SAMPLING **Lab Number:** L1302224

Project Number: 12201 **Report Date:** 02/15/13

Method Blank Analysis
Batch Quality Control

Analytical Method: 96,APH
Analytical Date: 02/08/13 14:12
Analyst: RY

Parameter	Result	Qualifier	Units	RL	MDL
Petroleum Hydrocarbons in Air - Mansfield Lab for sample(s): 01-06 Batch: WG589501-4					
1,3-Butadiene	ND		ug/m3	2.0	--
Methyl tert butyl ether	ND		ug/m3	2.0	--
Benzene	ND		ug/m3	2.0	--
C5-C8 Aliphatics, Adjusted	ND		ug/m3	12	--
Toluene	ND		ug/m3	2.0	--
Ethylbenzene	ND		ug/m3	2.0	--
p/m-Xylene	ND		ug/m3	4.0	--
o-Xylene	ND		ug/m3	2.0	--
Naphthalene	ND		ug/m3	2.0	--
C9-C12 Aliphatics, Adjusted	ND		ug/m3	14	--
C9-C10 Aromatics Total	ND		ug/m3	10	--

Lab Control Sample Analysis

Batch Quality Control

Project Name: CUMMINGS BEVERLY AIR SAMPLING

Project Number: 12201

Lab Number: L1302224

Report Date: 02/15/13

Parameter	LCS %Recovery	Qual	LCSD %Recovery	Qual	%Recovery Limits	RPD	Qual	RPD Limits
Petroleum Hydrocarbons in Air - Mansfield Lab Associated sample(s): 01-06 Batch: WG589501-3								
1,3-Butadiene	82		-		70-130	-		
Methyl tert butyl ether	76		-		70-130	-		
Benzene	88		-		70-130	-		
C5-C8 Aliphatics, Adjusted	94		-		70-130	-		
Toluene	90		-		70-130	-		
Ethylbenzene	94		-		70-130	-		
p/m-Xylene	94		-		70-130	-		
o-Xylene	96		-		70-130	-		
Naphthalene	128		-		50-150	-		
C9-C12 Aliphatics, Adjusted	105		-		70-130	-		
C9-C10 Aromatics Total	89		-		70-130	-		

Lab Duplicate Analysis
Batch Quality Control

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201

Lab Number: L1302224
Report Date: 02/15/13

Parameter	Native Sample	Duplicate Sample	Units	RPD	Qual	RPD Limits
Petroleum Hydrocarbons in Air - Mansfield Lab Associated sample(s): 01-06 QC Batch ID: WG589501-5 QC Sample: L1302224-01 Client ID: S-149-J						
1,3-Butadiene	ND	ND	ug/m3	NC		30
Methyl tert butyl ether	ND	ND	ug/m3	NC		30
Benzene	ND	ND	ug/m3	NC		30
C5-C8 Aliphatics, Adjusted	24	24	ug/m3	0		30
Toluene	ND	ND	ug/m3	NC		30
Ethylbenzene	ND	ND	ug/m3	NC		30
p/m-Xylene	ND	ND	ug/m3	NC		30
o-Xylene	ND	ND	ug/m3	NC		30
Naphthalene	ND	ND	ug/m3	NC		30
C9-C12 Aliphatics, Adjusted	110	120	ug/m3	9		30
C9-C10 Aromatics Total	ND	ND	ug/m3	NC		30

Project Name: CUMMINGS BEVERLY AIR SAMPLING **Lab Number:** L1302224

Project Number: 12201 **Report Date:** 02/15/13

Canister and Flow Controller Information

Samplenum	Client ID	Media ID	Media Type	Date Prepared	Bottle Order	Cleaning Batch ID	Can Leak Check	Initial Pressure (in. Hg)	Pressure on Receipt (in. Hg)	Flow Controler Leak Chk	Flow Out mL/min	Flow In mL/min	% RPD
L1302224-01	S-149-J	0241	#16 AMB	02/01/13	85229		-	-	-	Pass	3.3	3.2	3
L1302224-01	S-149-J	1000	6.0L Can	02/01/13	85229	L1301300-02	Pass	-29.5	-7.9	-	-	-	-
L1302224-02	DUP	0354	#16 AMB	02/01/13	85229		-	-	-	Pass	3.2	3.1	3
L1302224-02	DUP	1608	6.0L Can	02/01/13	85229	L1301300-02	Pass	-29.5	-9.1	-	-	-	-
L1302224-03	S-157-J	0223	#16 AMB	02/01/13	85229		-	-	-	Pass	3.1	3.3	6
L1302224-03	S-157-J	1583	6.0L Can	02/01/13	85229	L1301300-03	Pass	-29.5	-8.1	-	-	-	-
L1302224-04	S-1100	0373	#16 AMB	02/01/13	85229		-	-	-	Pass	3.0	3.0	0
L1302224-04	S-1100	967	6.0L Can	02/01/13	85229	L1301300-02	Pass	-29.5	-10.4	-	-	-	-
L1302224-05	S-171-X	0427	#16 AMB	02/01/13	85229		-	-	-	Pass	3.0	3.1	3
L1302224-05	S-171-X	608	6.0L Can	02/01/13	85229	L1301300-03	Pass	-29.5	-9.8	-	-	-	-
L1302224-06	NEPD	0286	#16 AMB	02/01/13	85229		-	-	-	Pass	3.0	3.1	3
L1302224-06	NEPD	985	6.0L Can	02/01/13	85229	L1301300-02	Pass	-28.9	-5.0	-	-	-	-

Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT
Lab Number: L1301300
Report Date: 02/15/13

Air Canister Certification Results

Lab ID: L1301300-02
Client ID: CAN 1608 SHELF 37
Sample Location:
Matrix: Air
Anaytical Method: 48,TO-15
Analytical Date: 01/26/13 16:46
Analyst: RY

Date Collected: 01/21/13 13:54
Date Received: 01/22/13
Field Prep: Not Specified

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air - Mansfield Lab								
Chlorodifluoromethane	ND	0.200	--	ND	0.707	--		1
Propylene	ND	0.500	--	ND	0.861	--		1
Propane	ND	0.200	--	ND	0.361	--		1
Dichlorodifluoromethane	ND	0.200	--	ND	0.989	--		1
Chloromethane	ND	0.200	--	ND	0.413	--		1
Freon-114	ND	0.200	--	ND	1.40	--		1
Methanol	ND	5.00	--	ND	6.55	--		1
Vinyl chloride	ND	0.200	--	ND	0.511	--		1
1,3-Butadiene	ND	0.200	--	ND	0.442	--		1
Butane	ND	0.200	--	ND	0.475	--		1
Bromomethane	ND	0.200	--	ND	0.777	--		1
Chloroethane	ND	0.200	--	ND	0.528	--		1
Ethanol	ND	2.50	--	ND	4.71	--		1
Dichlorofluoromethane	ND	0.200	--	ND	0.842	--		1
Vinyl bromide	ND	0.200	--	ND	0.874	--		1
Acrolein	ND	0.500	--	ND	1.15	--		1
Acetone	ND	1.00	--	ND	2.38	--		1
Acetonitrile	ND	0.200	--	ND	0.336	--		1
Trichlorofluoromethane	ND	0.200	--	ND	1.12	--		1
Isopropanol	ND	0.500	--	ND	1.23	--		1
Acrylonitrile	ND	0.200	--	ND	0.434	--		1
Pentane	ND	0.200	--	ND	0.590	--		1
Ethyl ether	ND	0.200	--	ND	0.606	--		1
1,1-Dichloroethene	ND	0.200	--	ND	0.793	--		1
Tertiary butyl Alcohol	ND	0.500	--	ND	1.52	--		1

Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT
Lab Number: L1301300
Report Date: 02/15/13

Air Canister Certification Results

Lab ID: L1301300-02
Client ID: CAN 1608 SHELF 37
Sample Location:
Date Collected: 01/21/13 13:54
Date Received: 01/22/13
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air - Mansfield Lab								
Methylene chloride	ND	1.00	--	ND	3.47	--		1
3-Chloropropene	ND	0.200	--	ND	0.626	--		1
Carbon disulfide	ND	0.200	--	ND	0.623	--		1
Freon-113	ND	0.200	--	ND	1.53	--		1
trans-1,2-Dichloroethene	ND	0.200	--	ND	0.793	--		1
1,1-Dichloroethane	ND	0.200	--	ND	0.809	--		1
Methyl tert butyl ether	ND	0.200	--	ND	0.721	--		1
Vinyl acetate	ND	0.200	--	ND	0.704	--		1
2-Butanone	ND	0.200	--	ND	0.590	--		1
cis-1,2-Dichloroethene	ND	0.200	--	ND	0.793	--		1
Ethyl Acetate	ND	0.500	--	ND	1.80	--		1
Chloroform	ND	0.200	--	ND	0.977	--		1
Tetrahydrofuran	ND	0.200	--	ND	0.590	--		1
2,2-Dichloropropane	ND	0.200	--	ND	0.924	--		1
1,2-Dichloroethane	ND	0.200	--	ND	0.809	--		1
n-Hexane	ND	0.200	--	ND	0.705	--		1
Diisopropyl ether	ND	0.200	--	ND	0.836	--		1
tert-Butyl Ethyl Ether	ND	0.200	--	ND	0.836	--		1
1,1,1-Trichloroethane	ND	0.200	--	ND	1.09	--		1
1,1-Dichloropropene	ND	0.200	--	ND	0.908	--		1
Benzene	ND	0.200	--	ND	0.639	--		1
Carbon tetrachloride	ND	0.200	--	ND	1.26	--		1
Cyclohexane	ND	0.200	--	ND	0.688	--		1
tert-Amyl Methyl Ether	ND	0.200	--	ND	0.836	--		1
Dibromomethane	ND	0.200	--	ND	1.42	--		1
1,2-Dichloropropane	ND	0.200	--	ND	0.924	--		1
Bromodichloromethane	ND	0.200	--	ND	1.34	--		1
1,4-Dioxane	ND	0.200	--	ND	0.721	--		1

Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT

Lab Number: L1301300
Report Date: 02/15/13

Air Canister Certification Results

Lab ID: L1301300-02
Client ID: CAN 1608 SHELF 37
Sample Location:

Date Collected: 01/21/13 13:54
Date Received: 01/22/13
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air - Mansfield Lab								
Trichloroethene	ND	0.200	--	ND	1.07	--		1
2,2,4-Trimethylpentane	ND	0.200	--	ND	0.934	--		1
Methyl Methacrylate	ND	0.500	--	ND	2.05	--		1
Heptane	ND	0.200	--	ND	0.820	--		1
cis-1,3-Dichloropropene	ND	0.200	--	ND	0.908	--		1
4-Methyl-2-pentanone	ND	0.200	--	ND	0.820	--		1
trans-1,3-Dichloropropene	ND	0.200	--	ND	0.908	--		1
1,1,2-Trichloroethane	ND	0.200	--	ND	1.09	--		1
Toluene	ND	0.200	--	ND	0.754	--		1
1,3-Dichloropropane	ND	0.200	--	ND	0.924	--		1
2-Hexanone	ND	0.200	--	ND	0.820	--		1
Dibromochloromethane	ND	0.200	--	ND	1.70	--		1
1,2-Dibromoethane	ND	0.200	--	ND	1.54	--		1
Butyl acetate	ND	0.500	--	ND	2.38	--		1
Octane	ND	0.200	--	ND	0.934	--		1
Tetrachloroethene	ND	0.200	--	ND	1.36	--		1
1,1,1,2-Tetrachloroethane	ND	0.200	--	ND	1.37	--		1
Chlorobenzene	ND	0.200	--	ND	0.921	--		1
Ethylbenzene	ND	0.200	--	ND	0.869	--		1
p/m-Xylene	ND	0.400	--	ND	1.74	--		1
Bromoform	ND	0.200	--	ND	2.07	--		1
Styrene	ND	0.200	--	ND	0.852	--		1
1,1,2,2-Tetrachloroethane	ND	0.200	--	ND	1.37	--		1
o-Xylene	ND	0.200	--	ND	0.869	--		1
1,2,3-Trichloropropane	ND	0.200	--	ND	1.21	--		1
Nonane	ND	0.200	--	ND	1.05	--		1
Isopropylbenzene	ND	0.200	--	ND	0.983	--		1
Bromobenzene	ND	0.200	--	ND	0.793	--		1

Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT

Lab Number: L1301300
Report Date: 02/15/13

Air Canister Certification Results

Lab ID: L1301300-02
Client ID: CAN 1608 SHELF 37
Sample Location:

Date Collected: 01/21/13 13:54
Date Received: 01/22/13
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air - Mansfield Lab								
2-Chlorotoluene	ND	0.200	--	ND	1.04	--		1
n-Propylbenzene	ND	0.200	--	ND	0.983	--		1
4-Chlorotoluene	ND	0.200	--	ND	1.04	--		1
4-Ethyltoluene	ND	0.200	--	ND	0.983	--		1
1,3,5-Trimethybenzene	ND	0.200	--	ND	0.983	--		1
tert-Butylbenzene	ND	0.200	--	ND	1.10	--		1
1,2,4-Trimethylbenzene	ND	0.200	--	ND	0.983	--		1
Decane	ND	0.200	--	ND	1.16	--		1
Benzyl chloride	ND	0.200	--	ND	1.04	--		1
1,3-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
1,4-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
sec-Butylbenzene	ND	0.200	--	ND	1.10	--		1
p-Isopropyltoluene	ND	0.200	--	ND	1.10	--		1
1,2-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
n-Butylbenzene	ND	0.200	--	ND	1.10	--		1
1,2-Dibromo-3-chloropropane	ND	0.200	--	ND	1.93	--		1
Undecane	ND	0.200	--	ND	1.28	--		1
Dodecane	ND	0.200	--	ND	1.39	--		1
1,2,4-Trichlorobenzene	ND	0.200	--	ND	1.48	--		1
Naphthalene	ND	0.200	--	ND	1.05	--		1
1,2,3-Trichlorobenzene	ND	0.200	--	ND	1.48	--		1
Hexachlorobutadiene	ND	0.200	--	ND	2.13	--		1

	Results	**Qualifier**	**Units**	**RDL**	**Dilution Factor**
Tentatively Identified Compounds					

No Tentatively Identified Compounds

Project Name: BATCH CANISTER CERTIFICATION **Lab Number:** L1301300

Project Number: CANISTER QC BAT **Report Date:** 02/15/13

Air Canister Certification Results

Lab ID: L1301300-02 Date Collected: 01/21/13 13:54

Client ID: CAN 1608 SHELF 37 Date Received: 01/22/13

Sample Location: Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air - Mansfield Lab								

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-Difluorobenzene	90		60-140
Bromochloromethane	91		60-140
chlorobenzene-d5	87		60-140

Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT
Lab Number: L1301300
Report Date: 02/15/13

Air Canister Certification Results

Lab ID: L1301300-02
Client ID: CAN 1608 SHELF 37
Sample Location:
Matrix: Air
Anaytical Method: 48,TO-15-SIM
Analytical Date: 01/22/13 20:47
Analyst: MB

Date Collected: 01/21/13 13:54
Date Received: 01/22/13
Field Prep: Not Specified

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air by SIM - Mansfield Lab								
Dichlorodifluoromethane	ND	0.050	--	ND	0.247	--		1
Chloromethane	ND	0.500	--	ND	1.03	--		1
Freon-114	ND	0.050	--	ND	0.349	--		1
Vinyl chloride	ND	0.020	--	ND	0.051	--		1
1,3-Butadiene	ND	0.020	--	ND	0.044	--		1
Bromomethane	ND	0.020	--	ND	0.078	--		1
Chloroethane	ND	0.020	--	ND	0.053	--		1
Acetone	ND	2.00	--	ND	4.75	--		1
Trichlorofluoromethane	ND	0.050	--	ND	0.281	--		1
Acrylonitrile	ND	0.500	--	ND	1.09	--		1
1,1-Dichloroethene	ND	0.020	--	ND	0.079	--		1
Methylene chloride	ND	1.00	--	ND	3.47	--		1
Freon-113	ND	0.050	--	ND	0.383	--		1
Halothane	ND	0.050	--	ND	0.404	--		1
trans-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
1,1-Dichloroethane	ND	0.020	--	ND	0.081	--		1
Methyl tert butyl ether	ND	0.020	--	ND	0.072	--		1
2-Butanone	ND	0.500	--	ND	1.47	--		1
cis-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
Chloroform	ND	0.020	--	ND	0.098	--		1
1,2-Dichloroethane	ND	0.020	--	ND	0.081	--		1
1,1,1-Trichloroethane	ND	0.020	--	ND	0.109	--		1
Benzene	ND	0.100	--	ND	0.319	--		1
Carbon tetrachloride	ND	0.020	--	ND	0.126	--		1
1,2-Dichloropropane	ND	0.020	--	ND	0.092	--		1

Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT
Lab Number: L1301300
Report Date: 02/15/13

Air Canister Certification Results

Lab ID: L1301300-02
Client ID: CAN 1608 SHELF 37
Sample Location:
Date Collected: 01/21/13 13:54
Date Received: 01/22/13
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air by SIM - Mansfield Lab								
Bromodichloromethane	ND	0.020	--	ND	0.134	--		1
1,4-Dioxane	ND	0.100	--	ND	0.360	--		1
Trichloroethene	ND	0.020	--	ND	0.107	--		1
cis-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
4-Methyl-2-pentanone	ND	0.500	--	ND	2.05	--		1
trans-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
1,1,2-Trichloroethane	ND	0.020	--	ND	0.109	--		1
Toluene	ND	0.050	--	ND	0.188	--		1
Dibromochloromethane	ND	0.020	--	ND	0.170	--		1
1,2-Dibromoethane	ND	0.020	--	ND	0.154	--		1
Tetrachloroethene	ND	0.020	--	ND	0.136	--		1
1,1,1,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
Chlorobenzene	ND	0.020	--	ND	0.092	--		1
Ethylbenzene	ND	0.020	--	ND	0.087	--		1
p/m-Xylene	ND	0.040	--	ND	0.174	--		1
Bromoform	ND	0.020	--	ND	0.207	--		1
Styrene	ND	0.020	--	ND	0.085	--		1
1,1,2,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
o-Xylene	ND	0.020	--	ND	0.087	--		1
Isopropylbenzene	ND	0.500	--	ND	2.46	--		1
1,3,5-Trimethybenzene	ND	0.020	--	ND	0.098	--		1
1,2,4-Trimethylbenzene	ND	0.020	--	ND	0.098	--		1
1,3-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,4-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
sec-Butylbenzene	ND	0.500	--	ND	2.74	--		1
p-Isopropyltoluene	ND	0.500	--	ND	2.74	--		1
1,2-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
n-Butylbenzene	ND	0.500	--	ND	2.74	--		1

Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT
Lab Number: L1301300
Report Date: 02/15/13

Air Canister Certification Results

Lab ID: L1301300-02
Client ID: CAN 1608 SHELF 37
Sample Location:
Date Collected: 01/21/13 13:54
Date Received: 01/22/13
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air by SIM - Mansfield Lab								
1,2,4-Trichlorobenzene	ND	0.050	--	ND	0.371	--		1
Naphthalene	ND	0.050	--	ND	0.262	--		1
1,2,3-Trichlorobenzene	ND	0.050	--	ND	0.371	--		1
Hexachlorobutadiene	ND	0.050	--	ND	0.533	--		1

Internal Standard	**% Recovery**	**Qualifier**	**Acceptance Criteria**
1,4-difluorobenzene	94		60-140
bromochloromethane	95		60-140
chlorobenzene-d5	95		60-140

Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT
Lab Number: L1301300
Report Date: 02/15/13

Air Canister Certification Results

Lab ID: L1301300-03
Client ID: CAN 959 SHELF 47
Sample Location:
Matrix: Air
Anaytical Method: 48,TO-15
Analytical Date: 01/26/13 17:17
Analyst: RY

Date Collected: 01/21/13 14:24
Date Received: 01/22/13
Field Prep: Not Specified

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air - Mansfield Lab								
Chlorodifluoromethane	ND	0.200	--	ND	0.707	--		1
Propylene	ND	0.500	--	ND	0.861	--		1
Propane	ND	0.200	--	ND	0.361	--		1
Dichlorodifluoromethane	ND	0.200	--	ND	0.989	--		1
Chloromethane	ND	0.200	--	ND	0.413	--		1
Freon-114	ND	0.200	--	ND	1.40	--		1
Methanol	ND	5.00	--	ND	6.55	--		1
Vinyl chloride	ND	0.200	--	ND	0.511	--		1
1,3-Butadiene	ND	0.200	--	ND	0.442	--		1
Butane	ND	0.200	--	ND	0.475	--		1
Bromomethane	ND	0.200	--	ND	0.777	--		1
Chloroethane	ND	0.200	--	ND	0.528	--		1
Ethanol	ND	2.50	--	ND	4.71	--		1
Dichlorofluoromethane	ND	0.200	--	ND	0.842	--		1
Vinyl bromide	ND	0.200	--	ND	0.874	--		1
Acrolein	ND	0.500	--	ND	1.15	--		1
Acetone	ND	1.00	--	ND	2.38	--		1
Acetonitrile	ND	0.200	--	ND	0.336	--		1
Trichlorofluoromethane	ND	0.200	--	ND	1.12	--		1
Isopropanol	ND	0.500	--	ND	1.23	--		1
Acrylonitrile	ND	0.200	--	ND	0.434	--		1
Pentane	ND	0.200	--	ND	0.590	--		1
Ethyl ether	ND	0.200	--	ND	0.606	--		1
1,1-Dichloroethene	ND	0.200	--	ND	0.793	--		1
Tertiary butyl Alcohol	ND	0.500	--	ND	1.52	--		1

Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT
Lab Number: L1301300
Report Date: 02/15/13

Air Canister Certification Results

Lab ID: L1301300-03
Client ID: CAN 959 SHELF 47
Sample Location:
Date Collected: 01/21/13 14:24
Date Received: 01/22/13
Field Prep: Not Specified

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air - Mansfield Lab								
Methylene chloride	ND	1.00	--	ND	3.47	--		1
3-Chloropropene	ND	0.200	--	ND	0.626	--		1
Carbon disulfide	ND	0.200	--	ND	0.623	--		1
Freon-113	ND	0.200	--	ND	1.53	--		1
trans-1,2-Dichloroethene	ND	0.200	--	ND	0.793	--		1
1,1-Dichloroethane	ND	0.200	--	ND	0.809	--		1
Methyl tert butyl ether	ND	0.200	--	ND	0.721	--		1
Vinyl acetate	ND	0.200	--	ND	0.704	--		1
2-Butanone	ND	0.200	--	ND	0.590	--		1
cis-1,2-Dichloroethene	ND	0.200	--	ND	0.793	--		1
Ethyl Acetate	ND	0.500	--	ND	1.80	--		1
Chloroform	ND	0.200	--	ND	0.977	--		1
Tetrahydrofuran	ND	0.200	--	ND	0.590	--		1
Xylenes, total	ND	0.600	--	ND	2.61	--		1
2,2-Dichloropropane	ND	0.200	--	ND	0.924	--		1
1,2-Dichloroethane	ND	0.200	--	ND	0.809	--		1
n-Hexane	ND	0.200	--	ND	0.705	--		1
Diisopropyl ether	ND	0.200	--	ND	0.836	--		1
tert-Butyl Ethyl Ether	ND	0.200	--	ND	0.836	--		1
1,1,1-Trichloroethane	ND	0.200	--	ND	1.09	--		1
1,1-Dichloropropene	ND	0.200	--	ND	0.908	--		1
Benzene	ND	0.200	--	ND	0.639	--		1
Carbon tetrachloride	ND	0.200	--	ND	1.26	--		1
Cyclohexane	ND	0.200	--	ND	0.688	--		1
tert-Amyl Methyl Ether	ND	0.200	--	ND	0.836	--		1
Dibromomethane	ND	0.200	--	ND	1.42	--		1
1,2-Dichloropropane	ND	0.200	--	ND	0.924	--		1
Bromodichloromethane	ND	0.200	--	ND	1.34	--		1

Project Name: BATCH CANISTER CERTIFICATION **Lab Number:** L1301300

Project Number: CANISTER QC BAT **Report Date:** 02/15/13

Air Canister Certification Results

Lab ID: L1301300-03 Date Collected: 01/21/13 14:24

Client ID: CAN 959 SHELF 47 Date Received: 01/22/13

Sample Location: Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air - Mansfield Lab								
1,4-Dioxane	ND	0.200	--	ND	0.721	--		1
Trichloroethene	ND	0.200	--	ND	1.07	--		1
2,2,4-Trimethylpentane	ND	0.200	--	ND	0.934	--		1
Methyl Methacrylate	ND	0.500	--	ND	2.05	--		1
Heptane	ND	0.200	--	ND	0.820	--		1
cis-1,3-Dichloropropene	ND	0.200	--	ND	0.908	--		1
4-Methyl-2-pentanone	ND	0.200	--	ND	0.820	--		1
trans-1,3-Dichloropropene	ND	0.200	--	ND	0.908	--		1
1,1,2-Trichloroethane	ND	0.200	--	ND	1.09	--		1
Toluene	ND	0.200	--	ND	0.754	--		1
1,3-Dichloropropane	ND	0.200	--	ND	0.924	--		1
2-Hexanone	ND	0.200	--	ND	0.820	--		1
Dibromochloromethane	ND	0.200	--	ND	1.70	--		1
1,2-Dibromoethane	ND	0.200	--	ND	1.54	--		1
Butyl acetate	ND	0.500	--	ND	2.38	--		1
Octane	ND	0.200	--	ND	0.934	--		1
Tetrachloroethene	ND	0.200	--	ND	1.36	--		1
1,1,1,2-Tetrachloroethane	ND	0.200	--	ND	1.37	--		1
Chlorobenzene	ND	0.200	--	ND	0.921	--		1
Ethylbenzene	ND	0.200	--	ND	0.869	--		1
p/m-Xylene	ND	0.400	--	ND	1.74	--		1
Bromoform	ND	0.200	--	ND	2.07	--		1
Styrene	ND	0.200	--	ND	0.852	--		1
1,1,2,2-Tetrachloroethane	ND	0.200	--	ND	1.37	--		1
o-Xylene	ND	0.200	--	ND	0.869	--		1
1,2,3-Trichloropropane	ND	0.200	--	ND	1.21	--		1
Nonane	ND	0.200	--	ND	1.05	--		1
Isopropylbenzene	ND	0.200	--	ND	0.983	--		1

Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT

Lab Number: L1301300
Report Date: 02/15/13

Air Canister Certification Results

Lab ID: L1301300-03
Client ID: CAN 959 SHELF 47
Sample Location:

Date Collected: 01/21/13 14:24
Date Received: 01/22/13
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air - Mansfield Lab								
Bromobenzene	ND	0.200	--	ND	0.793	--		1
2-Chlorotoluene	ND	0.200	--	ND	1.04	--		1
n-Propylbenzene	ND	0.200	--	ND	0.983	--		1
4-Chlorotoluene	ND	0.200	--	ND	1.04	--		1
4-Ethyltoluene	ND	0.200	--	ND	0.983	--		1
1,3,5-Trimethybenzene	ND	0.200	--	ND	0.983	--		1
tert-Butylbenzene	ND	0.200	--	ND	1.10	--		1
1,2,4-Trimethylbenzene	ND	0.200	--	ND	0.983	--		1
Decane	ND	0.200	--	ND	1.16	--		1
Benzyl chloride	ND	0.200	--	ND	1.04	--		1
1,3-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
1,4-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
sec-Butylbenzene	ND	0.200	--	ND	1.10	--		1
p-Isopropyltoluene	ND	0.200	--	ND	1.10	--		1
1,2-Dichlorobenzene	ND	0.200	--	ND	1.20	--		1
n-Butylbenzene	ND	0.200	--	ND	1.10	--		1
1,2-Dibromo-3-chloropropane	ND	0.200	--	ND	1.93	--		1
Undecane	ND	0.200	--	ND	1.28	--		1
Dodecane	ND	0.200	--	ND	1.39	--		1
1,2,4-Trichlorobenzene	ND	0.200	--	ND	1.48	--		1
Naphthalene	ND	0.200	--	ND	1.05	--		1
1,2,3-Trichlorobenzene	ND	0.200	--	ND	1.48	--		1
Hexachlorobutadiene	ND	0.200	--	ND	2.13	--		1

	Results	**Qualifier**	**Units**	**RDL**	**Dilution Factor**
Tentatively Identified Compounds					

No Tentatively Identified Compounds

Project Name: BATCH CANISTER CERTIFICATION **Lab Number:** L1301300

Project Number: CANISTER QC BAT **Report Date:** 02/15/13

Air Canister Certification Results

Lab ID: L1301300-03 Date Collected: 01/21/13 14:24

Client ID: CAN 959 SHELF 47 Date Received: 01/22/13

Sample Location: Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air - Mansfield Lab								

Internal Standard	% Recovery	Qualifier	Acceptance Criteria
1,4-Difluorobenzene	89		60-140
Bromochloromethane	91		60-140
chlorobenzene-d5	86		60-140

Project Name: BATCH CANISTER CERTIFICATION **Lab Number:** L1301300

Project Number: CANISTER QC BAT **Report Date:** 02/15/13

Air Canister Certification Results

Lab ID: L1301300-03
Client ID: CAN 959 SHELF 47
Sample Location:
Matrix: Air
Anaytical Method: 48,TO-15-SIM
Analytical Date: 01/22/13 21:19
Analyst: MB

Date Collected: 01/21/13 14:24
Date Received: 01/22/13
Field Prep: Not Specified

Parameter	ppbV Results	ppbV RL	ppbV MDL	ug/m3 Results	ug/m3 RL	ug/m3 MDL	Qualifier	Dilution Factor
Volatile Organics in Air by SIM - Mansfield Lab								
Dichlorodifluoromethane	ND	0.050	--	ND	0.247	--		1
Chloromethane	ND	0.500	--	ND	1.03	--		1
Freon-114	ND	0.050	--	ND	0.349	--		1
Vinyl chloride	ND	0.020	--	ND	0.051	--		1
1,3-Butadiene	ND	0.020	--	ND	0.044	--		1
Bromomethane	ND	0.020	--	ND	0.078	--		1
Chloroethane	ND	0.020	--	ND	0.053	--		1
Acetone	ND	2.00	--	ND	4.75	--		1
Trichlorofluoromethane	ND	0.050	--	ND	0.281	--		1
Acrylonitrile	ND	0.500	--	ND	1.09	--		1
1,1-Dichloroethene	ND	0.020	--	ND	0.079	--		1
Methylene chloride	ND	1.00	--	ND	3.47	--		1
Freon-113	ND	0.050	--	ND	0.383	--		1
Halothane	ND	0.050	--	ND	0.404	--		1
trans-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
1,1-Dichloroethane	ND	0.020	--	ND	0.081	--		1
Methyl tert butyl ether	ND	0.020	--	ND	0.072	--		1
2-Butanone	ND	0.500	--	ND	1.47	--		1
cis-1,2-Dichloroethene	ND	0.020	--	ND	0.079	--		1
Chloroform	ND	0.020	--	ND	0.098	--		1
1,2-Dichloroethane	ND	0.020	--	ND	0.081	--		1
1,1,1-Trichloroethane	ND	0.020	--	ND	0.109	--		1
Benzene	ND	0.100	--	ND	0.319	--		1
Carbon tetrachloride	ND	0.020	--	ND	0.126	--		1
1,2-Dichloropropane	ND	0.020	--	ND	0.092	--		1

Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT
Lab Number: L1301300
Report Date: 02/15/13

Air Canister Certification Results

Lab ID: L1301300-03
Client ID: CAN 959 SHELF 47
Sample Location:
Date Collected: 01/21/13 14:24
Date Received: 01/22/13
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air by SIM - Mansfield Lab								
Bromodichloromethane	ND	0.020	--	ND	0.134	--		1
1,4-Dioxane	ND	0.100	--	ND	0.360	--		1
Trichloroethene	ND	0.020	--	ND	0.107	--		1
cis-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
4-Methyl-2-pentanone	ND	0.500	--	ND	2.05	--		1
trans-1,3-Dichloropropene	ND	0.020	--	ND	0.091	--		1
1,1,2-Trichloroethane	ND	0.020	--	ND	0.109	--		1
Toluene	ND	0.050	--	ND	0.188	--		1
Dibromochloromethane	ND	0.020	--	ND	0.170	--		1
1,2-Dibromoethane	ND	0.020	--	ND	0.154	--		1
Tetrachloroethene	ND	0.020	--	ND	0.136	--		1
1,1,1,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
Chlorobenzene	ND	0.020	--	ND	0.092	--		1
Ethylbenzene	ND	0.020	--	ND	0.087	--		1
p/m-Xylene	ND	0.040	--	ND	0.174	--		1
Bromoform	ND	0.020	--	ND	0.207	--		1
Styrene	ND	0.020	--	ND	0.085	--		1
1,1,2,2-Tetrachloroethane	ND	0.020	--	ND	0.137	--		1
o-Xylene	ND	0.020	--	ND	0.087	--		1
Isopropylbenzene	ND	0.500	--	ND	2.46	--		1
1,3,5-Trimethybenzene	ND	0.020	--	ND	0.098	--		1
1,2,4-Trimethylbenzene	ND	0.020	--	ND	0.098	--		1
1,3-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
1,4-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
sec-Butylbenzene	ND	0.500	--	ND	2.74	--		1
p-Isopropyltoluene	ND	0.500	--	ND	2.74	--		1
1,2-Dichlorobenzene	ND	0.020	--	ND	0.120	--		1
n-Butylbenzene	ND	0.500	--	ND	2.74	--		1

Project Name: BATCH CANISTER CERTIFICATION
Project Number: CANISTER QC BAT
Lab Number: L1301300
Report Date: 02/15/13

Air Canister Certification Results

Lab ID: L1301300-03
Client ID: CAN 959 SHELF 47
Sample Location:
Date Collected: 01/21/13 14:24
Date Received: 01/22/13
Field Prep: Not Specified

	ppbV			ug/m3				
Parameter	**Results**	**RL**	**MDL**	**Results**	**RL**	**MDL**	**Qualifier**	**Dilution Factor**
Volatile Organics in Air by SIM - Mansfield Lab								
1,2,4-Trichlorobenzene	ND	0.050	--	ND	0.371	--		1
Naphthalene	ND	0.050	--	ND	0.262	--		1
1,2,3-Trichlorobenzene	ND	0.050	--	ND	0.371	--		1
Hexachlorobutadiene	ND	0.050	--	ND	0.533	--		1

Internal Standard	**% Recovery**	**Qualifier**	**Acceptance Criteria**
1,4-difluorobenzene	91		60-140
bromochloromethane	93		60-140
chlorobenzene-d5	93		60-140

AIR Petro Can Certification

Project Name: BATCH CANISTER CERTIFICATION **Lab Number:** L1301300

Project Number: CANISTER QC BAT **Report Date:** 02/15/13

AIR CAN CERTIFICATION RESULTS

Lab ID:	L1301300-02	Date Collected:	01/21/13 13:54
Client ID:	CAN 1608 SHELF 37	Date Received:	01/22/13
Sample Location:	Not Specified	Field Prep:	Not Specified
Matrix:	Air		
Analytical Method:	96,APH		
Analytical Date:	01/22/13 20:47		
Analyst:	MB		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Petroleum Hydrocarbons in Air - Mansfield Lab						
1,3-Butadiene	ND		ug/m3	2.0	--	1
Methyl tert butyl ether	ND		ug/m3	2.0	--	1
Benzene	ND		ug/m3	2.0	--	1
C5-C8 Aliphatics, Adjusted	ND		ug/m3	12	--	1
Toluene	ND		ug/m3	2.0	--	1
Ethylbenzene	ND		ug/m3	2.0	--	1
p/m-Xylene	ND		ug/m3	4.0	--	1
o-Xylene	ND		ug/m3	2.0	--	1
Naphthalene	ND		ug/m3	2.0	--	1
C9-C12 Aliphatics, Adjusted	ND		ug/m3	14	--	1
C9-C10 Aromatics Total	ND		ug/m3	10	--	1

Project Name: BATCH CANISTER CERTIFICATION **Lab Number:** L1301300

Project Number: CANISTER QC BAT **Report Date:** 02/15/13

AIR CAN CERTIFICATION RESULTS

Lab ID:	L1301300-03	Date Collected:	01/21/13 14:24
Client ID:	CAN 959 SHELF 47	Date Received:	01/22/13
Sample Location:	Not Specified	Field Prep:	Not Specified
Matrix:	Air		
Analytical Method:	96,APH		
Analytical Date:	01/22/13 21:19		
Analyst:	MB		

Parameter	Result	Qualifier	Units	RL	MDL	Dilution Factor
Petroleum Hydrocarbons in Air - Mansfield Lab						
1,3-Butadiene	ND		ug/m3	2.0	--	1
Methyl tert butyl ether	ND		ug/m3	2.0	--	1
Benzene	ND		ug/m3	2.0	--	1
C5-C8 Aliphatics, Adjusted	ND		ug/m3	12	--	1
Toluene	ND		ug/m3	2.0	--	1
Ethylbenzene	ND		ug/m3	2.0	--	1
p/m-Xylene	ND		ug/m3	4.0	--	1
o-Xylene	ND		ug/m3	2.0	--	1
Naphthalene	ND		ug/m3	2.0	--	1
C9-C12 Aliphatics, Adjusted	ND		ug/m3	14	--	1
C9-C10 Aromatics Total	ND		ug/m3	10	--	1

Project Name: CUMMINGS BEVERLY AIR SAMPLING
Project Number: 12201

Lab Number: L1302224
Report Date: 02/15/13

Sample Receipt and Container Information

Were project specific reporting limits specified? YES

Reagent H2O Preserved Vials Frozen on: NA

Cooler Information **Custody Seal**
Cooler
N/A Absent

Container Information

Container ID	Container Type	Cooler	pH	Temp deg C	Pres	Seal	Analysis(*)
L1302224-01A	Canister - 6 Liter	N/A	N/A		Y	Absent	MCP-TO15-SIM(30),APH-10(30),MCP-TO15(30)
L1302224-02A	Canister - 6 Liter	N/A	N/A		Y	Absent	MCP-TO15-SIM(30),APH-10(30),MCP-TO15(30)
L1302224-03A	Canister - 6 Liter	N/A	N/A		Y	Absent	MCP-TO15-SIM(30),APH-10(30),MCP-TO15(30)
L1302224-04A	Canister - 6 Liter	N/A	N/A		Y	Absent	MCP-TO15-SIM(30),APH-10(30),MCP-TO15(30)
L1302224-05A	Canister - 6 Liter	N/A	N/A		Y	Absent	MCP-TO15-SIM(30),APH-10(30),MCP-TO15(30)
L1302224-06A	Canister - 6 Liter	N/A	N/A		Y	Absent	MCP-TO15-SIM(30),APH-10(30),MCP-TO15(30)

*Values in parentheses indicate holding time in days

Project Name:	CUMMINGS BEVERLY AIR SAMPLING	**Lab Number:**	L1302224
Project Number:	12201	**Report Date:**	02/15/13

GLOSSARY

Acronyms

EDL - Estimated Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The EDL includes any adjustments from dilutions, concentrations or moisture content, where applicable. The use of EDLs is specific to the analysis of PAHs using Solid-Phase Microextraction (SPME).

EPA - Environmental Protection Agency.

LCS - Laboratory Control Sample: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

LCSD - Laboratory Control Sample Duplicate: Refer to LCS.

LFB - Laboratory Fortified Blank: A sample matrix, free from the analytes of interest, spiked with verified known amounts of analytes or a material containing known and verified amounts of analytes.

MDL - Method Detection Limit: This value represents the level to which target analyte concentrations are reported as estimated values, when those target analyte concentrations are quantified below the reporting limit (RL). The MDL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

MS - Matrix Spike Sample: A sample prepared by adding a known mass of target analyte to a specified amount of matrix sample for which an independent estimate of target analyte concentration is available.

MSD - Matrix Spike Sample Duplicate: Refer to MS.

NA - Not Applicable.

NC - Not Calculated: Term is utilized when one or more of the results utilized in the calculation are non-detect at the parameter's reporting unit.

NI - Not Ignitable.

RL - Reporting Limit: The value at which an instrument can accurately measure an analyte at a specific concentration. The RL includes any adjustments from dilutions, concentrations or moisture content, where applicable.

RPD - Relative Percent Difference: The results from matrix and/or matrix spike duplicates are primarily designed to assess the precision of analytical results in a given matrix and are expressed as relative percent difference (RPD). Values which are less than five times the reporting limit for any individual parameter are evaluated by utilizing the absolute difference between the values; although the RPD value will be provided in the report.

SRM - Standard Reference Material: A reference sample of a known or certified value that is of the same or similar matrix as the associated field samples.

Footnotes

1 - The reference for this analyte should be considered modified since this analyte is absent from the target analyte list of the original method.

Terms

Analytical Method: Both the document from which the method originates and the analytical reference method. (Example: EPA 8260B is shown as 1,8260B.) The codes for the reference method documents are provided in the References section of the Addendum.

Data Qualifiers

A - Spectra identified as "Aldol Condensation Product".

B - The analyte was detected above the reporting limit in the associated method blank. Flag only applies to associated field samples that have detectable concentrations of the analyte at less than five times (5x) the concentration found in the blank. For MCP-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank. For DOD-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte at less than ten times (10x) the concentration found in the blank AND the analyte was detected above one-half the reporting limit (or above the reporting limit for common lab contaminants) in the associated method blank. For NJ-Air-related projects, flag only applies to associated field samples that have detectable concentrations of the analyte above the reporting limit.

C - Co-elution: The target analyte co-elutes with a known lab standard (i.e. surrogate, internal standards, etc.) for co-extracted analyses.

D - Concentration of analyte was quantified from diluted analysis. Flag only applies to field samples that have detectable concentrations of the analyte.

E - Concentration of analyte exceeds the range of the calibration curve and/or linear range of the instrument.

G - The concentration may be biased high due to matrix interferences (i.e, co-elution) with non-target compound(s). The result should be considered estimated.

H - The analysis of pH was performed beyond the regulatory-required holding time of 15 minutes from the time of sample collection.

I - The RPD between the results for the two columns exceeds the method-specified criteria; however, the lower value has been reported

Report Format: Data Usability Report

Project Name:	CUMMINGS BEVERLY AIR SAMPLING	**Lab Number:**	L1302224
Project Number:	12201	**Report Date:**	02/15/13

Data Qualifiers

due to obvious interference.

M - Reporting Limit (RL) exceeds the MCP CAM Reporting Limit for this analyte.

NJ - Presumptive evidence of compound. This represents an estimated concentration for Tentatively Identified Compounds (TICs), where the identification is based on a mass spectral library search.

P - The RPD between the results for the two columns exceeds the method-specified criteria.

Q - The quality control sample exceeds the associated acceptance criteria. For DOD-related projects, LCS and/or Continuing Calibration Standard exceedences are also qualified on all associated sample results. Note: This flag is not applicable for matrix spike recoveries when the sample concentration is greater than 4x the spike added or for batch duplicate RPD when the sample concentrations are less than 5x the RL. (Metals only.)

R - Analytical results are from sample re-analysis.

RE - Analytical results are from sample re-extraction.

J - Estimated value. This represents an estimated concentration for Tentatively Identified Compounds (TICs).

ND - Not detected at the reporting limit (RL) for the sample.

Report Format: Data Usability Report

Project Name:	CUMMINGS BEVERLY AIR SAMPLING	**Lab Number:**	L1302224
Project Number:	12201	**Report Date:**	02/15/13

REFERENCES

96 Method for the Determination of Air-Phase Petroleum Hydrocarbons (APH), MassDEP, December 2009, Revision 1 with QC Requirements & Performance Standards for the Analysis of APH by GC/MS under the Massachusetts Contingency Plan, WSC-CAM-IXA, July 2010.

101 Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air (EPA/625/R-96/010b:January 1999) with QC Requirements & Performance Standards for the Analysis of TO-15 under the Massachusetts Contingency Plan, WSC-CAM-IXB, July 2010.

LIMITATION OF LIABILITIES

Alpha Analytical performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical be held liable for any incidental, consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding time and splitting of samples in the field.

Certificate/Approval Program Summary

Last revised August 3, 2012 – Mansfield Facility

The following list includes only those analytes/methods for which certification/approval is currently held.
For a complete listing of analytes for the referenced methods, please contact your Alpha Customer Service Representative.

Connecticut Department of Public Health Certificate/Lab ID: PH-0141.

Wastewater/Non-Potable Water (Inorganic Parameters: pH, Turbidity, Conductivity, Alkalinity, Aluminum, Antimony, Arsenic, Barium, Beryllium, Boron, Cadmium, Calcium, Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Potassium, Selenium, Silver, Sodium, Strontium, Thallium, Tin, Titanium, Vanadium, Zinc, Total Residue (Solids), Total Suspended Solids (non-filterable). Organic Parameters: PCBs, Organochlorine Pesticides, Technical Chlordane, Toxaphene, Acid Extractables, Benzidines, Phthalate Esters, Nitrosamines, Nitroaromatics & Isophorone, PAHs, Haloethers, Chlorinated Hydrocarbons, Volatile Organics.)

Solid Waste/Soil (Inorganic Parameters: pH, Aluminum, Antimony, Arsenic, Barium, Beryllium, Cadmium, Calcium, Chromium, Hexavalent Chromium, Cobalt, Copper, Iron, Lead, Magnesium, Manganese, Mercury, Molybdenum, Nickel, Potassium, Selenium, Silver, Sodium, Thallium, Titanium, Vanadium, Zinc, Total Organic Carbon, Corrosivity, TCLP 1311, SPLP 1312. Organic Parameters: PCBs, Organochlorine Pesticides, Technical Chlordane, Toxaphene, Volatile Organics, Acid Extractables, Benzidines, Phthalates, Nitrosamines, Nitroaromatics & Cyclic Ketones, PAHs, Haloethers, Chlorinated Hydrocarbons.)

Florida Department of Health Certificate/Lab ID: E87814. ***NELAP Accredited.***

Non-Potable Water (Inorganic Parameters: SM2320B, SM2540D, SM2540G.)

Solid & Chemical Materials (Inorganic Parameters: 6020, 7470, 7471, 9045. Organic Parameters: EPA 8260, 8270, 8082, 8081.)

Air & Emissions (EPA TO-15.)

Louisiana Department of Environmental Quality Certificate/Lab ID: 03090. ***NELAP Accredited.***

Non-Potable Water (Inorganic Parameters: EPA 180.1, 245.7, 1631E, 3020A, 6020A, 7470A, 9040, 9050A, SM2320B, 2540D, 2540G, 4500H-B, Organic Parameters: EPA 3510C, 3580A, 3630C, 3640A, 3660B, 3665A, 5030B, 8015D, 3570, 8081B, 8082A, 8260B, 8270C, 8270D.)

Solid & Chemical Materials (Inorganic Parameters: EPA 1311, 3050B, 3051A, 3060A, 6020A, 7196A, 7470A, 7471B, 7474, 9040B, 9045C, 9060. Organic Parameters: EPA 3540C, 3570, 3580A, 3630C, 3640A, 3660, 3665A, 5035, 8015D, 8081B, 8082A, 8260B, 8270C, 8270D.)

Biological Tissue (Inorganic Parameters: EPA 6020A. Organic Parameters: EPA 3570, 3510C, 3610B, 3630C, 3640A, 8270C, 8270D.)

Air & Emissions (EPA TO-15.)

New Hampshire Department of Environmental Services Certificate/Lab ID: 2206. ***NELAP Accredited.***

Non-Potable Water (Inorganic Parameters: EPA 180.1, 1631E, 6020A, 7470A, 9040B, 9050A, SM2540D, 2540G, 4500H+B, 2320B, 3020A, . Organic Parameters: EPA 3510C, 3630C, 3640A, 3660B, 8081B, 8082A, 8270C, 8270D, 8015D.)

Solid & Chemical Materials (Inorganic Parameters: SW-846 1311, 3050B, 3051A, 6020A, 7471B, 9040B, 9045C. Organic Parameters: SW-846 3540C, 3580A, 3630C, 3640A, 3660B, 3665A, 8270C, 8015D, 8082A, 8081B.)

New Jersey Department of Environmental Protection Certificate/Lab ID: MA015. ***NELAP Accredited.***

Non-Potable Water (Inorganic Parameters: SW-846 1312, 3020A, SM2320B, SM2540D, 2540G, 4500H-B, EPA 180.1, 1631E, SW-846 7470A, 9040C, 6020A, 9050A. Organic Parameters: SW-846 3510C, 3580A, 3630C, 3640A, 3660B, 3665A, 8015D, 8081B, 8082A, 8270C, 8270D)

Solid & Chemical Materials (Inorganic Parameters: SW-846 1311, 1312, 3050B, 3051A, 6020A, 7471B, 7474, 9040B, 9040C, 9045C, 9045D, 9060. Organic Parameters: SW-846 3540C, 3570, 3580A, 3630C, 3640A, 3660B, 3665A, 8081B, 8082A, 8270C, 8270D, 8015D.)

Atmospheric Organic Parameters (EPA 3C, TO-15, TO-10A, TO-13A-SIM.)

Biological Tissue (Inorganic Parameters: SW-846 6020A. Organic Parameters: SW-846 8270C, 8270D, 3510C, 3570, 3610C, 3630C, 3640A)

New York Department of Health Certificate/Lab ID: 11627. ***NELAP Accredited.***

Non-Potable Water (Inorganic Parameters: SM2320B, SM2540D, 6020A, 1631E, 7470A, 9050A, EPA 180.1, 3020A. Organic Parameters: EPA 8270C, 8270D, 8081B, 8082A, 3510C.)

Solid & Hazardous Waste (Inorganic Parameters: EPA 6020A, 7471B, 7474, 9040C, 9045D. Organic Parameters: EPA 8270C, 8270D, 8081B, 8082A, 1311, 3050B, 3580A, 3570, 3051A.)

Air & Emissions (EPA TO-15, TO-10A.)

Pennsylvania Certificate/Lab ID: 68-02089 ***NELAP Accredited***

Non-Potable Water (Inorganic Parameters: 1312, 1631E, 180.1, 3020A, 6020A, 7470A, 9040B, 9050A, 2320B, 2540D, 2540G, SM4500H+-B. Organic Parameters: 3510C, 3580A, 3630C, 3640A, 3660B, 3665A, 8015D, 8081B, 8082A, 8270C, 8270D .)

Solid & Hazardous Waste (Inorganic Parameters: EPA 1311, 3051A, 6020A, 7471B, 7474 9040B, 9045C, 9060. Organic Parameters: EPA3050B, 3540C, 3570, 3580A, 3630C, 3640A, 3660B, 3665A, 8270C, 8270D, 8081B, 8015D, 8082A.)

Rhode Island Department of Health Certificate/Lab ID: LAO00299. ***NELAP Accredited via NJ-DEP.***

Refer to NJ-DEP Certificate for Non-Potable Water.

Texas Commission of Environmental Quality Certificate/Lab ID: T104704419-08-TX. ***NELAP Accredited.***

Solid & Chemical Materials (Inorganic Parameters: EPA 6020, 7470, 7471, 1311, 9040, 9045, 9060. Organic Parameters: EPA 8015, 8270, 8081, 8082.)

Air (Organic Parameters: EPA TO-15)

Virginia Division of Consolidated Laboratory Services Certificate/Lab ID:460194. ***NELAP Accredited.***

Non-Potable Water (Inorganic Parameters:EPA 3020A, 6020A, 245.7, 9040B. Organic Parameters: EPA 3510C, 3640A, 3660B, 3665A, 8270C, 8270D, 8082A, 8081B, 8015D.)

Solid & Chemical Materials (Inorganic Parameters: EPA 6020A,7470A,7471B,9040B,9045C,3050B,3051, 9060. Organic Parameters: EPA 3540C, 3580A, 3630C, 3640A, 3660B, 3665A, 3570, 8270C, 8270D, 8081B, 8082A, 8015D.)

Washington State Department of Ecology Certificate/Lab ID: C954. *Non-Potable Water* (Inorganic Parameters: SM2540D, 180.1, 1631E.)

Solid & Chemical Materials (Inorganic Parameters: EPA 6020, 7470, 7471, 7474, 9045C, 9050A, 9060. Organic Parameters: EPA 8081, 8082, 8015, 8270.)

U.S. Army Corps of Engineers

Department of Defense, L-A-B Certificate/Lab ID: L2217.01.

Non-Potable Water (Inorganic Parameters: EPA 6020A, SM4500H-B. Organic Parameters: 3020A, 3510C, 8270C, 8270D, 8270C-ALK-PAH, 8270D-ALK-PAH, 8082A, 8081B, 8015D-SHC, 8015D.)

Solid & Hazardous Waste (Inorganic Parameters: EPA 1311, 3050B, 6020A, 7471A, 9045C, 9060, SM 2540G, ASTM D422-63. Organic Parameters: EPA 3580A, 3570, 3540C, 8270C, 8270D, 8270C-ALK-PAH, 8270D-ALK-PAH 8082A, 8081B, 8015D-SHC, 8015D.

Air & Emissions (EPA TO-15.)

Analytes Not Accredited by NELAP

Certification is not available by NELAP for the following analytes: **8270C:** Biphenyl. **TO-15:** Halothane, 2,4,4-Trimethyl-2-pentene, 2,4,4-Trimethyl-1-pentene, Thiophene, 2-Methylthiophene, 3-Methylthiophene, 2-Ethylthiophene, 1,2,3-Trimethylbenzene, Indan, Indene, 1,2,4,5-Tetramethylbenzene, Benzothiophene, 2-Methylnaphthalene, 1-Methylnaphthalene.

AIR ANALYSIS

PAGE 1 OF 1

CHAIN OF CUSTODY

320 Forbes Blvd, Mansfield, MA 02048
TEL: 508-822-9300 FAX: 508-822-3288

Date Rec'd in Lab:

ALPHA Job #: L1302224

Client Information

Client: Geosphere Environmental Management, Inc
Address: 51 Portsmouth Ave.
Exeter, NH 03833
Phone: 603-773-0075 x14
Fax: 603-773-0077
Email: bhoskins@geospherenh.com

☐ These samples have been previously analyzed by Alpha

Project Information

Project Name: Cummings Beverly Air Sampling
Project Location: Beverly, MA
Project #: 12201
Project Manager: Bruce Hoskins
ALPHA Quote #:

Turn-Around Time

☒ Standard ☐ RUSH (only confirmed if pre-approved!)

Date Due: Time:

Report Information - Data Deliverables

☐ FAX
☐ ADEx
Criteria Checker:
(Default based on Regulatory Criteria Indicated)
Other Formats:
☒ EMAIL (standard pdf report)
☒ Additional Deliverables: Hard copy in Mail
Report to: (if different than Project Manager)

Billing Information

☒ Same as Client info PO #:

Regulatory Requirements/Report Limits

State/Fed	Program	Criteria

Other Project Specific Requirements/Comments: Run entire TO-15 compound list - Quantify per TO-15 SIM where applicable

All Columns Below Must Be Filled Out

ALPHA Lab ID (Lab Use Only)	Sample ID	Collection Date	Start Time	End Time	Initial Vacuum	Final Vacuum	Sample Matrix*	Sampler's Initials	Can Size	I D Can	I D - Flow Controller	TO-14A by TO-15	TO-15	TO-15 SIM	APH	FIXED GASES	TO-13A	TO-4 / TO-10	Sample Comments (i.e. PID)
-1	S-149-J	2/4/2013	3:05pm	3:05pm	-29.36	-7.35	AA	CB	6L	1000	0241		X	X	X				
-2	DUP		3:07pm	3:07pm	-29.55	-8.63	AA	CB	6L	1608	0354		X	X	X				
-3	S-157-J		3:14pm	3:14pm	-29.67	-7.80	AA	CB	6L	1583	0223		X	X	X				
-4	S-1100		3:40pm	3:40pm	-29.53	-9.93	AA	CB	6L	967	0373		X	X	X				
-5	S-171-X		3:30pm	3:30pm	-29.81	-9.30	AA	CB	6L	608	0427		X	X	X				
-6	NEPD		3:20pm	3:20pm	-28.92	-6.04	AA	CB	6L	985	0286		X	X	X				

ANALYSIS

*SAMPLE MATRIX CODES

AA = Ambient Air (Indoor/Outdoor)
SV = Soil Vapor/Landfill Gas/SVE
Other = Please Specify

Container Type							
		CS	CS	CS			

Please print clearly, legibly and completely. Samples can not be logged in and turnaround time clock will not start until any ambiguities are resolved. All samples submitted are subject to Alpha's Terms and Conditions. See reverse side.

Relinquished By:	Date/Time	Received By:	Date/Time:
	2/6/13 11:25		2/6/13 1125
	2/6/13 1630		2/7/13 0955
	2/7/13 1055		2/7/13 1055

Appendix B

Data Validation Review Memoranda

GEOSPHERE
ENVIRONMENTAL MANAGEMENT INC.

Memorandum

To: **Bruce Hoskins**

From: **David Niemeyer**

Date: **November 30, 2012**

RE: **Data Validation Review: Air Samples: Cummings Center, Beverly, MA: Laboratory Report #L1217119**

SUMMARY

Limited validation was performed on the data for six air samples collected at the Cummings Center in Beverly, MA. The samples were collected for a 24-hour period and began on September 20, 2012, and concluded on September 21, 2012. The samples were submitted to Alpha Analytical of Mansfield, MA for analysis. The samples were analyzed for volatile petroleum hydrocarbons (VOCs) using the EPA Methodology for TO-15 and TO-15 Selected Ion Monitoring (SIM) and air-phase petroleum hydrocarbons (APH) per Massachusetts Department of Environmental Protection (MassDEP) methodology per the Compendium of Analytical Methods (CAM).

In general, the data appear to be valid as reported and may be used for decision-making purposes. The analysis value of isopropyl alcohol in sample S-157-J was estimated as the analysis for this compound was based on a re-analysis on dilution in order to quantitate the sample within the calibration range. Also, the relative percent difference (RPD) of the pre- and post-flow controller calibration check for sample S-1100 (measured at 21% RPD) was outside the acceptable limits (less than or equal to 20% RPD). These issues have a minor impact on the data usability.

SAMPLES

Samples included in this review are listed below:

S-149-J (Alpha ID Number L1217119-01)
Duplicate of S-149-J (Alpha ID Number L1217119-02)
S-157-J (Alpha ID Number L1217119-03)
S-1100 (Alpha ID Number L1217119-04)
S-171-X (Alpha ID Number L1217119-05)
NEPD (Alpha ID Number L1217119-06)

51 PORTSMOUTH AVENUE, EXETER, NEW HAMPSHIRE 03833
Telephone: 603-773-0075 Fax: 603-773-0077
www.geospherenh.com

REVIEW ELEMENTS

Sample data were reviewed for the following parameters:

- Agreement of analyses conducted with GEOSPHERE requests
- Holding times and sample preservation
- Method blanks
- Laboratory control sample (LCS) results
- Field duplicate results
- Quantitation limits and sample results
- Air canister certification results

DISCUSSION

Agreement of Analyses Conducted with GEOSPHERE Requests

The sample report was checked to verify that the results corresponded to analytical requests as designated on the chain-of-custody and any other correspondence between GEOSPHERE and the laboratory. An initial laboratory analysis report was submitted on October 2, 2012, however there was a discrepancy. The full TO-15 analyte list as designated in the Quality Assurance Project Plan (QAPP) was not performed; only those compounds using TO-15 SIM were reported. 20 additional compounds that could be performed using TO-15 only were not quantified. GEOSPHERE requested that as many of these additional compounds be quantified using the existing scans and chromotograms. A subsequent report was issued on October 31, 2012, which included the quantification of 14 additional compounds (listed separately for each sample). Six compounds (1,4-dioxane, 3-chloropropene, benzyl chloride, n-heptane, vinyl acetate, and vinyl bromide) could not be quantified in this way and are listed as Not Analyzed on the data summary table in the Status Report.

Holding Times and Sample Preservation

Samples were analyzed within the method-specific holding time. No sample preservation was required for this type of sampling.

Method Blanks

Target compounds were not detected in the methods blanks for either the TO-15 or APH analyses.

LCS Results

An LCS and LCS Duplicate were analyzed with the samples for both TO-15 and APH analyses. All LCS recoveries and RPDs were acceptable for both TO-15 and APH analyses.

Field Duplicate Results

Samples L1217119-01 and L1217119-02 were submitted as the field duplicate pair for this sample set and both represented location S-149-J. The field and duplicate sample were collected using two canisters located next to each other. The following table summarizes the RPDs of the detected compounds.

Compound	L1217119-01 ($\mu g/m^3$)	L1217119-02 ($\mu g/m^3$)	RPD (%)
1,1,1-Trichloroethane	0.114	0.114	0.0
1,2,4-Trimethylbenzene	2.55	2.56	0.4
1,2-Dichloroethane	0.166	0.162	2.4
1,3,5-Trimethylbenzene	0.792	0.801	1.1
1,3-Butadiene	0.055	0.064	15.1
2-Butanone	1.64	1.52	5.1
Acetone	68.9	55.8	21.0
Benzene	0.396	0.386	2.6
Bromodichloromethane	0.141	0.147	4.2
Carbon Tetrachloride	0.321	0.321	0.0
Chloroform	0.796	0.796	0.0
Dichlorodifluoromethane	0.846	1.14	29.2
Ethanol	228	187	19.8
Ethylbenzene	0.452	0.443	2.0
Freon-113	0.475	0.483	1.7
Hexane	1.07	1.88	54.9
Isopropyl Alcohol	152	118	25.2
m/p- Xylenes	1.63	1.61	1.2
o-Xylene	0.725	0.721	0.6
Styrene	1.06	1.09	3.2
Tetrachloroethene	0.468	0.237	65.5
Toluene	3.18	3.06	3.8
Trichlorofluoromethane	1.02	1.04	1.9
Toluene (APH)	2.9	2.9	0.0
C_5-C_8 Aliphatics	110	110	0.0
C_9-C_{12} Aliphatics	86	82	4.8

It should be noted that acceptable RPDs for field duplicates are less than 40% for compounds whose detected values are greater than five times the estimate quantitation limit (EQL); and for compounds whose detected values are less than five times the EQL, value differences between the field sample and its associated duplicate are to be less than 2.5 times the EQL. Based on these criteria, the RPDs for all compounds listed above are acceptable. The only compounds with RPDs greater than 40% (hexane and tetrachloroethene) had values detected less than five times the EQL and their value differences were less than 2.5 times the EQL.

Quantitation Limits and Sample Results

Sample S-157-J (L1217119-03) was re-analyzed on dilution for isopropyl alcohol to quantitate the sample within the calibration range. The result for this parameter should be considered to be estimated and is noted in the analytical report with an "E" qualifier.

Air Canister Certification Results

Air canister certifications were performed using batch canister certifications for analyses of TO-15, TO-15 SIM, and APH. All certifications were acceptable as no compounds were detected and all internal standard recoveries were acceptable.

GEOSPHERE
ENVIRONMENTAL MANAGEMENT INC.

Memorandum

To: **Bruce Hoskins**

From: **David Niemeyer**

Date: **March 27, 2013**

RE: **Data Validation Review: Air Samples: Cummings Center, Beverly, MA: Laboratory Report #L1302224**

SUMMARY

Limited validation was performed on the data for six air samples collected at the Cummings Center in Beverly, MA. The samples were collected for a 24-hour period and began on February 4, 2013, and concluded on February 5, 2013. The samples were submitted to Alpha Analytical of Mansfield, MA for analysis. The samples were analyzed for volatile petroleum hydrocarbons (VOCs) using the EPA Methodology for TO-15 and TO-15 Selected Ion Monitoring (SIM) and air-phase petroleum hydrocarbons (APH) per Massachusetts Department of Environmental Protection (MassDEP) methodology per the Compendium of Analytical Methods (CAM).

In general, the data appear to be valid as reported and may be used for decision-making purposes. The analysis value of isopropyl alcohol in sample S-157-J was estimated as the analysis for this compound was based on a re-analysis on dilution in order to quantitate the sample within the calibration range. Also, the results for chloromethane in sample S-1100 should be considered estimated due to co-elution with a non-target peak. These issues have a minor impact on the data usability.

SAMPLES

Samples included in this review are listed below:

S-149-J (Alpha ID Number L1302224-01)
Duplicate of S-149-J (Alpha ID Number L1302224-02)
S-157-J (Alpha ID Number L1302224-03)
S-1100 (Alpha ID Number L1302224-04)
S-171-X (Alpha ID Number L1302224-05)
NEPD (Alpha ID Number L1302224-06)

51 PORTSMOUTH AVENUE, EXETER, NEW HAMPSHIRE 03833
Telephone: 603-773-0075 Fax: 603-773-0077
www.geospherenh.com

REVIEW ELEMENTS

Sample data were reviewed for the following parameters:

- Agreement of analyses conducted with GEOSPHERE requests
- Holding times and sample preservation
- Method blanks
- Laboratory control sample (LCS) results
- Field duplicate results
- Quantitation limits and sample results
- Air canister certification results

DISCUSSION

Agreement of Analyses Conducted with GEOSPHERE Requests

The sample report was checked to verify that the results corresponded to analytical requests as designated on the chain-of-custody and any other correspondence between GEOSPHERE and the laboratory. An initial laboratory analysis report was submitted on February 13, 2013, however there was a discrepancy. The full TO-15 analyte list as designated in the Quality Assurance Project Plan (QAPP) was performed: the majority of compounds were determined using TO-15 SIM and 20 additional compounds were analyzed using TO-15. Of these 20 compounds, six compounds (1,4-dioxane, 3-chloropropene, benzyl chloride, n-heptane, vinyl acetate, and vinyl bromide) were not quantified. A subsequent report was issued on February 15, 2013, which included the quantification of these six compounds.

Holding Times and Sample Preservation

Samples were analyzed within the method-specific holding time. No sample preservation was required for this type of sampling.

Method Blanks

Target compounds were not detected in the methods blanks for either the TO-15 or APH analyses.

LCS Results

An LCS and LCS Duplicate were analyzed with the samples for both TO-15 and APH analyses. All LCS recoveries and RPDs were acceptable for both TO-15 and APH analyses.

Field Duplicate Results

Samples L1302224-01 and L1302224-02 were submitted as the field duplicate pair for this sample set and both represented location S-149-J. The field and duplicate sample were collected using two canisters located next to each other. The following table summarizes the RPDs of the detected compounds.

Compound	L1302224-01 ($\mu g/m^3$)	L1302224-02 ($\mu g/m^3$)	RPD (%)
1,1,1-Trichloroethane	0.207	0.196	5.4
1,2,4-Trimethylbenzene	0.575	0.123	129.5
1,2-Dichloroethane	0.105	0.093	12.1
1,3,5-Trimethylbenzene	0.172	<0.098	N/A
2-Butanone	1.07	<0.59	N/A
Acetone	22.4	12.2	59.0
Benzene	0.585	0.514	12.9
Bromodichloromethane	0.141	<0.134	N/A
Carbon Tetrachloride	0.591	0.56	5.4
Chloroform	0.449	0.42	6.6
Chloromethane	1.03	<1.03	N/A
Dichlorodifluoromethane	2.35	2.25	4.3
Ethanol	266	173	42.4
Ethylbenzene	0.291	0.174	50.2
Freon-113	0.491	0.491	0.0
Hexane	0.814	0.737	9.9
Isopropyl Alcohol	137	53.8	87.2
m/p- Xylenes	0.903	0.46	65.0
o-Xylene	0.395	0.28	34.0
Styrene	0.353	<0.085	N/A
Toluene	1.09	0.837	26.2
Trichlorofluoromethane	1.24	1.23	0.8
C_5-C_8 Aliphatics	24	16	40
C_9-C_{12} Aliphatics	110	43	87.6

It should be noted that acceptable RPDs for field duplicates are less than 40% for compounds whose detected values are greater than five times the estimated quantitation limit (EQL); and for compounds whose detected values are less than five times the EQL, value differences between the field sample and its associated duplicate are to be less than 2.5 times the EQL. Based on these criteria, the RPDs for the compounds listed above are acceptable except for 1,2,4-Trimethylbenzene, Acetone, Ethanol, Isopropyl Alcohol, m/p- Xylenes, Styrene, and C_9-C_{12} Aliphatics. Of interesting note is that based on the analysis results, the quantitative results for sample L1302224-02 were consistently lower than the results for sample L1302224-01, meaning there may have been a malfunction in the canister for L1302224-02 or in the sample aliquot

removal in the laboratory allowing ambient air to dilute the collected sample. No significant issues with the canisters were noted in the field data or in the analytical analysis report.

Quantitation Limits and Sample Results

Sample S-157-J (L1302224-03) was re-analyzed on dilution for isopropyl alcohol to quantitate the sample within the calibration range. The result for this parameter should be considered to be estimated and is noted in the analytical summary table (**Table 1**) with an "E" qualifier. For sample S-1100 (L1302224-04), the results for chloromethane should be considered estimated due to co-elution with a non-target peak. The result for this parameter is noted in the analytical summary table (**Table 1**) with an "E" qualifier.

Air Canister Certification Results

Air canister certifications were performed using batch canister certifications for analyses of TO-15, TO-15 SIM, and APH. All certifications were acceptable as no compounds were detected and all internal standard recoveries were acceptable.